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From January 1, 1899, to December 31, 1899

RAILROAD GAZETTE

A JOURNAL OF TRANSPORTATION, ENGINEERING AND RAILROAD NEWS

(Established in April, 1856)



FORTY-THIRD YEAR

NEW YORK,

32 PARK PLACE.

1899





FRIDAY, JANUARY 6, 1899

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Contributions.

The Nicaragua Canal Report.

New York, Dec. 31.

To the Editor of the Railroad Gazette:

We get from the Walker Board what might have been expected from a board which was instructed to design as well as criticise. It has done more than pass judgment on the plans of the Maritime Company, which was the scope of the Ludlow Board; it has really condemned the route itself.

It would be premature to review this very general report, but with the change of location and plans and a divergence of 20 per cent. in the estimates in the minds of the board itself, we have enough to call attention to the increasing uncertainties and difficulties of this canal.

The brilliant discovery of the San Francisco basin route, heralded as of the greatest value to the canal promoters, was adhered to by the canal company for nearly a decade, though condemned again and again by competent engineering testimony. Now, with the change suggested by the present Walker Board, we are turned back to the beginning of things, and a route is selected long since abandoned by the canal company as unsuitable.

The contrast with the well considered and definite plans and estimates for the steadily progressing new Panama Canal is worth note at this juncture, when frantic efforts are being made by the Nicaragua Canal promoters to foist this uncertain will o' the wisp upon the American people by presenting it as the only and fleeting chance to satisfy a glorious patriotism. Would it not be well to pursue this ignis fatuus a little further, until we can hold it long enough to turn upon it the light of a thorough investigation by an International Commission, as was suggested in one of your recent issues.

As to our political and military rights at Panama, the treaty with the Colombian Government, which we have acted under effectively several times, gives this country without any necessity for modifications all we could desire in every respect. We, as a nation, are the only people with which the United States of Colombia has ever made a treaty wherein is guaranteed to Colombia the neutrality of this route, and we are the only nation having "special and remarkable advantages" affirmed to us by treaty stipulation.

C. E.

Cast Steel Locomotive Frames.

To the Editor of the Railroad Gazette:

I am much obliged for the opportunity to see the proof of your article on cast steel locomotive frames. I am interested in the statement that it is not the general practice at Thurlow to anneal castings. I should think castings such as frames, which have the outer skin removed in finishing, ought to be annealed to remove the strains set up by unequal cooling. Otherwise warping might be expected when the outer surface was removed. The annealing of heavy steel forgings is considered very essential.

There is one other point which I believe is going to aid in the introduction of cast steel for frames and similar parts of locomotives now made of wrought iron, and that is the uncertain nature of the wrought iron now made. There is now so much steel mixed with the wrought iron scrap that it is practically impossible to prevent pieces of steel from being piled with the wrought iron. Whenever a piece of steel slips in a defective forging is the result. Blacksmiths in railroad shops, whom I have questioned, all say it is becoming more and more difficult

to make good wrought iron from their own scrap, and that the wrought iron purchased in the market is unreliable. This partly accounts for the growing use of steel for axles, piston rods, crank pins, etc., although in each case the steel has other important advantages to recommend it. As a general proposition, the quality of wrought iron has decreased, while that of steel of all kinds has greatly improved.

A stock objection to cast steel frames is that if broken they cannot be repaired (welded) as readily as the wrought iron frames. The experience of the Chicago, Rock Island & Pacific shows that there is little in this. The cast steel frame of one of their 10-wheel passenger engines broke about a year ago, and the foreman of the blacksmith shop told me he had no trouble in welding the cast steel. Of course if properly designed the frames should not break, but if it were impossible to repair a broken cast steel frame so as to be as good as new, this fact would condemn it among the men who have to maintain the locomotives.

W.

To the Editor of the Railroad Gazette:

I have looked over the proof of the article on cast steel locomotive frames very carefully, and see very little to criticise or suggest. I believe this article is timely and is full of information which will be of great interest to locomotive men.

The only criticism which I would make is, that the article seems just a little "rose colored" as regards blow-holes and shrink-flaws; even with the best foundry practice thus far available, I should not think these evils could be wholly prevented. On the other hand, of course, with wrought iron frames we have the constant danger of bad welds.

I look for a gradual introduction of cast steel frames, but believe that the introduction will be considerably slower than your article suggests.

M. E.

The Causes of the Buckling of the Brooklyn Bridge.

Wilmington, Del., Dec. 21.

To the Editor of the Railroad Gazette:

Mr. Collingwood's description of the Brooklyn Bridge and explanation of the buckling of certain parts of it, in your issue of Nov. 18, and the comments thereon in the succeeding issues, have been of absorbing interest, but there seems to be a circumstance that has escaped notice.

Mr. Collingwood's reasons for the buckling are not entirely satisfactory, in that he gives no reason why truss No. 4 (referring to his nomenclature) should have buckled at a point 225 ft. from the New York pier, when the successive accumulations of the horizontal components of the pulls on the stays must have reached a maximum compression close to the pier and have been much greater there than where the failure actually took place.

Again, he gives no explanation whatever for the buckling of truss No. 1. He distinctly states that the moving load on that driveway was less than usual, yet that truss buckled. From the information obtainable there seems to be no possibility of any portion of the excess load on the blocked driveway, on the extreme southern side of the bridge, having been transferred to cable A, on the extreme northern side. Nor could the buckling have been transferred by the direct thrust of the cross girder, or else the four intermediate trusses would have buckled similarly. In other words, truss No. 1 buckled under circumstances affecting it alone, and under loads less than ordinary.

Col. Roebling states that this buckling had occurred before, and Mr. Collingwood states that truss No. 3 had previously buckled. Whether this occurred at any time of overloading or not is not stated.

In a structure of this kind, where the dead load forms such a large proportion of the total load, it is difficult for an outsider, without definite data, to understand how a doubling, or even trebling, of the live load could increase the unit stresses much beyond the limit of elasticity, presuming a factor of safety of 5 or 6 to have been used originally, this requiring a number of repetitions to effect rupture.

It is not intended to question the alleged overloading, nor criticise the regulations laid down by Col. Roebling and the present bridge authorities, nor to criticise the conclusions and recommendations of the Board of Experts, all of which are perfectly correct and proper for the preservation of the structure. But it is intended to argue from the sudden failure of some of the trusses, which should have been gradual, from the failure of another at a point of minor stress, and of still another under less live load than usual, and from the previous failures, under unknown but certainly not remarkable conditions of loading, and finally from the striking coincidence of all of these failures occurring very close to the point of change from fixed stays to movable stays, that there is another cause for these failures, independent of, though perhaps aggravated by, the overloading complained of, and which is seemingly liable to occur frequently.

All this would suggest inquiry whether Prof. Johnson is not correct, in his letter to you of Nov. 25, in his assignment of causes, which were perhaps aggravated by shock due to suddenness of readjust-

ment arising from the defective working of the slip joint at the center.

Every American engineer is proud of the Brooklyn Bridge and proud of the men who accomplished the task of its construction, and every one has a personal interest in joining with Col. Roebling in asking for a recalculation of the bridge under existing loads. But this recalculation should not only be in reference to the growing danger of overloading, but also so far as is possible in reference to these failures and their cause. If they are to be expected, and are of minor consequence, as is intimated in Chief Engineer Martin's report, and only entail a few sleepless nights to the repair gang, this fact should be of public record, so as to avoid panics. If, on the other hand, as does not seem probable from previous experiences, there is any liability for them to decrease seriously the safety of the structure, the cause and the remedy cannot too quickly be determined.

GEORGE TATNALL.

Rail Circuit Signals on the Boston & Albany.*

By George W. Blodgett.

There are many ways in which a signal may be made to operate under the control of a rail circuit. Other things being equal, that plan will be best which will accomplish the desired result with the least amount of apparatus, and with the simplest possible arrangement. The application of this principle will lead to the rigid examination of every appliance with a view to discover and eliminate all needless complications. The experience of the writer with signal apparatus leads him to believe that a considerable amount of money can often wisely be spent in working over a design after a practical scheme has been discovered, to produce if possible a more simple form of instrument or method of accomplishing the result. A double saving will be made in the removal of every superfluous part or appliance, first, in the decreased cost of the apparatus, and second, in the lessened liability to get out of order. It makes little relative difference whether or not one machine or device costs a few dollars more in the beginning than another which is nearly but not quite as good (as that is a sum paid once for all,) but it is important whether or not the cost of maintenance or liability to derangement is greater, for this is a continual expense, as long as the apparatus is used. A very small percentage of difference here will soon overbalance a considerably larger first cost. The expense of repairs should therefore receive the principal consideration and not alone the first cost, as is too often the case.

Construction work may proceed in any order preferred. I believe that the most economical results will be secured when the force of men employed is sufficient to do the work in the shortest possible time, consistent with good work. It costs but little, if any more, for superintendent when all parts of the work are going on at the same time than when only a portion of it is being done. Particular circumstances may justify a departure from the general rule for such work as requires skilled supervision. There is no particular order in which such work should always be done, but the drilling of the track should be completed before or as soon as the other work is finished, and there is no disadvantage in doing this first of all. The writer has had experience with both skilled and unskilled labor for signal construction, and it is his judgment that it is most economical to have skilled mechanics, well trained and properly instructed for the part of the work they are to do, while for the rougher portions of the work, common laborers may be employed with economy, under the supervision of the trained men just referred to. The mistake should not be made of using skilled, expensive labor for work which may well enough be done by a cheaper class of help, because thereby the cost of construction is materially increased without any corresponding benefit. Trained and costly labor should only be used for the important and difficult parts of the work, and to direct that part of the force which is unskilled.

The use of rail circuits requires more or less line wire on poles, and at least a battery connected with the rails at one end, and a relay of some form similarly connected at the other; and usually there are connections to one or more intermediate points for the operation of some auxiliary part of the apparatus. The connections between the batteries and relays and the rails, are usually made by insulated wires run underground. After making many experiments the writer has found that some kinds of insulated wire will be durable and satisfactory in certain kinds of soil, while in others they soon decay. Some wires should be laid in a wooden box or iron pipe, while others will last nearly as long without either. Since the wooden trunking frequently costs nearly or quite as much as the wire itself, it is sometimes more profitable to lay the wire in the earth without protection and to renew it somewhat oftener than to pay the expense of better construction. In

* For preceding articles on Boston & Albany signals see July 22, p. 530, and August 5, p. 563.

most kinds of soil a lead covering outside the rubber insulation is entirely satisfactory as regards durability, while in other soils it is rapidly destroyed. It also has the disadvantage of being more often damaged by lightning, the wire within and the lead covering without acting like a Leyden jar or condenser which becomes so highly charged with electricity that a spark breaks through the insulation and destroys it. The lead covering is occasionally ruptured and torn off as by a violent explosion. If this arrangement is to be used under ground, each piece of wire should have at both ends an efficient lightning arrester, which will protect it from too heavy a charge. This added to the first cost of the wire (which is a great deal more than for rubber insulation alone) makes construction very expensive, and it is doubtful if the benefit gained justifies the outlay. The writer has also tried encasing wires in a trough filled with melted pitch. This adds to their durability, but repairs are more difficult. The writer knows of one brand of insulated wire that justly ranks as one of the very best in wet places or under water, but which fails in a comparatively short time for underground work where it is sometimes moist and sometimes dry. Whatever the manner in which the wire is laid in the ground, some protection is necessary where it joins the rails, as here it is liable to injury from trackmen. The connection between the ground wires and the track wires running to the rails should be well protected from moisture to prevent electrolytic action between the two metals where they join. The bonding of the rails at the joints may be done by one or two wires. Two wires cost more, but the liability to interruption of the circuit is considerably lessened.

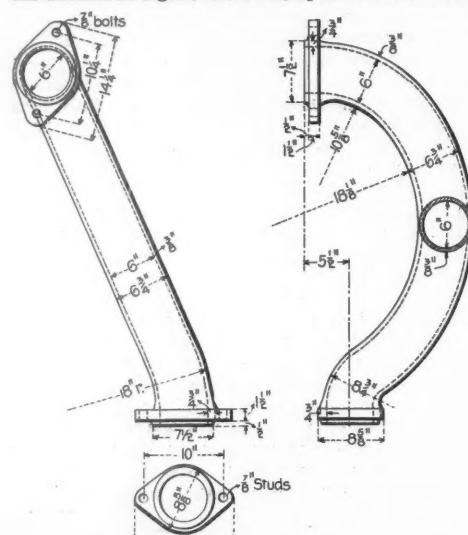
The writer has made experiments with different kinds of batteries for signal work, and while others may possess an advantage for particular purposes, he believes that for most kinds of work there is nothing better or more economical than the simple gravity battery. It has the advantage of being the simplest and cheapest of all, and of being better understood by men of ordinary capacity; and is more easily kept in order, though it consumes somewhat more material and probably costs rather more for maintenance than some of the more expensive batteries; but it may be used without special arrangement under nearly all circumstances, while the others are more limited in their application. Batteries are best located from five to eight feet under ground in battery wells or chutes, where the temperature remains nearly constant. These chutes may be made of wood, iron or concrete. It is very difficult to make wooden battery chutes water-tight. Iron or concrete may more easily be made so, but the writer's experience with these has been too short to enable him to judge with certainty as to their durability or relative economy. The first cost is of course considerably higher. Where many cells of battery can be brought together, a brick or wooden battery well will be found advantageous, and it may profitably be surrounded with a small building, which furnishes a convenient place for the location of the instruments, and provides shelter for the battery men in doing their work, in storms or extremely cold weather.

The question has often been raised as to the relative merits of different forms of signals, especially the semaphore and the disk. It is not the purpose of the writer here to enter upon a discussion of this subject, but according to his experience the disk form for automatic signals has been perfectly satisfactory, and the claims of superiority for the semaphore for this class of work have not in his judgment been fully sustained. For interlocking or manual block signals he would always use semaphores, but since the function of automatic signals is different from either of the others, he thinks a different form of signal has a distinct advantage; and while open to conviction on the subject, he does not yet see that a uniform style of signals which are used in different ways and for different purposes is to be desired. Any automatic signal is likely sometimes to be in the danger position when the cause is not apparent to the engineer of a train about to enter the block. It seems necessary that trains should be allowed to pass automatic signals at danger, but under extra precaution expecting to find the block occupied. Very frequently the position of the signal is entirely correct, but the cause has been removed before the train arrives at the point where the danger indicated by the signal exists. Sometimes, however, from accidents or derangements, the signal is out of order, and it would manifestly be out of the question for the train to wait at the signal until it cleared. Such systems must therefore usually be operated on the permissive block principle, which the writer believes ought seldom or never to be done with manual block or inter-locking systems. This, I think, is a strong argument for separating the two systems in the form of signal as well as the manner of its use.

Whether or not an automatic signal should stand nominally in the danger position or the all-clear position, is as yet an open question. There is considerable discussion of the relative merits of the two forms, and the relative advantages of the two arrangements are likely to be fully brought out. Signals standing normally clear have been for many years under the writer's charge. His experience with

the normal danger system has been for a much shorter time, but yet for several years past he has had a large number of these signals under his charge, and he believes that the normal danger system has distinct advantages over the other, in that derangements which may occur do not leave the signal all-clear and invite a train to enter a block already occupied. In the writer's experience, the system is also less liable to be out of order; when derangements do occur they will perhaps delay trains a little more but the signals do not indicate an occupied block to be all-clear. It also costs less for maintenance than the other, and he believes that the system will usually give better results.

An automatic signal should be operated with as lit-



Malleable Iron Steam Pipe.

tle machinery as possible, and there should be no clock-work or other superfluous devices intermediate between the apparatus and its means of control—in this case the rail circuit. It is true that a signal operated entirely by electricity uses more material in the batteries and costs somewhat more to maintain, but it has the advantage of being far less liable to derangement, and for this reason there is far greater safety in its use. But in no business within the writer's knowledge should more care be exercised than in the construction of apparatus for automatic signals. It should be as carefully and correctly made as a locomotive or a watch. Too much pains can never be taken in the selection of the best materials, and the mechanical work of construction should be of a high class. Little or nothing need be spent merely for ornamentation, but the working parts of the different machines or apparatus should be made and fitted with great care. Corresponding parts of different instruments should also be exact duplicates of each other so that there may never be difficulty in renewing or changing any part of an instrument when circumstances require. A neglect by some of the signal companies to observe this rule has cost the writer much time, trouble and expense, and such faults occasionally seriously hamper the maintenance of signal apparatus, because separate parts of signals, etc., cannot be easily fitted and do not work with reliability.

Whether a disk signal should be inclosed or uninclosed, the writer is unable dogmatically to affirm. There are arguments in favor of both forms, but his own judgment is in favor of inclosed signals, with which no serious difficulty for ambiguity has arisen in his own experience. He is familiar with the theoretical objections to their use, but he has not found such difficulties actually to occur in practice.

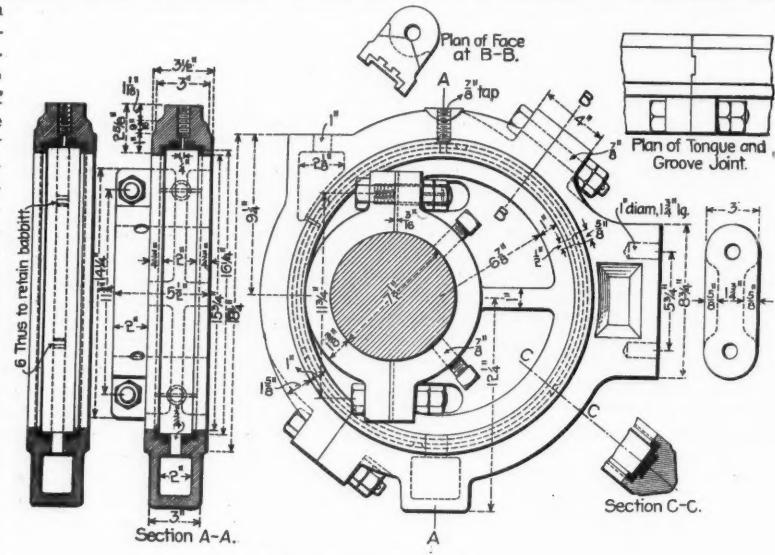
The writer has under his charge automatic signals of various patterns, and arranged in circuits of various kinds. Those used in the older form of apparatus were selected by the companies furnishing the signals. They are not those originally designed for the apparatus, but have now modifications or additions suggested by the railroad company's experience in the use of the signals or by changes in the running of trains. In the more recent extensions, the writer has himself designed or suggested many of the improvements intended to eliminate sources of weakness or danger. The wire circuit signals at first used contained an ingenious device for raising the signal

disk from a concealed position to the displayed position (indicating danger) and locking it there, and another device scarcely less ingenious, for unlocking it and allowing it to fall out of sight by gravitation. These must of necessity be capable of responding to a momentary impulse of the current, while the signal itself, possessing considerable inertia, could move only with comparative slowness. The action of the current therefore must store up, during the instant while it is in operation, energy enough to complete the movement of the signal, whether that be made in a longer or shorter time. This was done by compressing a spiral spring, the release of which moved the signal. A carefully designed mechanism also cut off the battery current when it had done its work, in order that its full strength might be available for use elsewhere, as the same battery was used to operate the signals on several miles of road, and it was important to concentrate and conserve as much as possible its energy. This plan did not prove so economical and satisfactory as was hoped, and there was too much complication; hence as soon as an opportunity offered, changes and simplifications of the system were made which greatly improved its working, and some years later the whole plan of circuit was altered to conform more nearly to the requirements of practical operations, as was described in the article of July 22.

Since, however, the rail circuit possesses several distinct advantages over the wire circuit, no new work of the latter kind has been done on the Boston & Albany for a long time, and whenever extensive repairs or alterations of the wire circuits are required, advantage is taken of the opportunity to change a portion of those signals to operate from a rail circuit. In a few years more it is likely the whole of the system now remaining will be thus converted. It is not necessary to change the form of the signal instrument, but only the means of controlling it, therefore the Hall signals, changed from wire circuit to rail circuit, are exactly the same in appearance as the others. On the new work, however, an iron post and smaller signal case have replaced the forms shown in the descriptive article referred to. These signals operate entirely by electricity, there is no machinery intermediate between the current and the electro-magnet that operates the signal, and they require no other care than cleaning and oiling two or three times a year, and replenishing the battery when necessary.

Locomotive Parts Made of Malleable Iron.

Each addition to the number of the parts of a locomotive which can be made profitably of malleable iron is of interest to all railroad men. It is very important that vibrating parts be made as light as possible, and yet insure sufficient strength, and that other parts, the weight of which is not available, or is not desired, to increase the weight on the driving wheels, be kept at a minimum; it would seem that



Malleable Iron Eccentric Strap.

Mr. J. H. McConnell, Superintendent of Motive Power of the Union Pacific, to whom we are indebted for drawings of a malleable iron eccentric strap and of a malleable iron steam pipe, has selected two parts which may very well be made of this material.

Eccentric Strap.—It is possible that there are in use eccentric straps of cast iron that do not weigh more than the one shown, but if the failures of the same are as few in number as of those made of malleable iron, railroad men would be pleased to know of them. Mr. McConnell says that failure of the strap shown is all but unknown. One of the features of the strap, as will be observed, is the facility afforded for getting oil to the wearing surfaces of eccentric and strap. In long, fast passenger train runs it is quite as important to provide a means of getting oil quickly to the wearing surface of the eccentric after a wait of sufficient duration to allow the oil to run from such surface, as it is to provide a constant supply of oil while the locomotive is in motion; the oil cup

and oil pocket at the top, and the oil pocket at the bottom of the strap make ample provision for this, and the location of the plane of separation between the two pieces of the strap, as shown, is quite necessary for the success of such an arrangement. The strap has a facing of babbitt.

Steam Pipe.—There are several good reasons for making the steam pipe of malleable iron; a less weight is possible than when gray cast iron is used, and because almost the entire weight of the pipe is carried on the truck, if the locomotive has a truck, the weight is not available for adhesion; also, it is reported that the joints at the ends of the pipe are kept tight more easily, because any springing caused by the pressure of steam inside or by expansion due to high temperature takes place in the pipe itself when the pipe is made as thin as is possible in malleable, and the joints are thereby relieved. As steam pressures have been increased some difficulty has been experienced in securing the joints sufficiently firmly to hold them tight, and in some instances it has been found necessary to use four bolts, or studs, at either end of the pipe; it will be observed that only two $\frac{1}{8}$ -in. studs at the bottom and two $\frac{1}{8}$ -bolts at the top are used with the malleable iron pipe, and it is reported that no difficulty is experienced in keeping the joints tight with these, although the steam

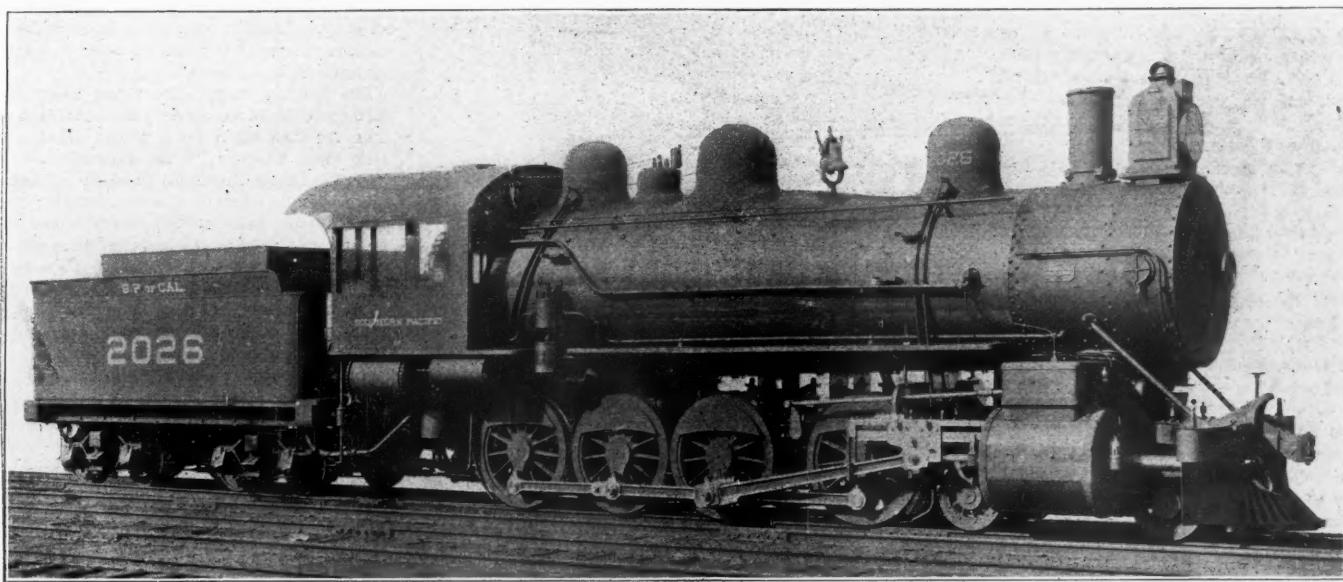
Circumferential seams	Double riveted
Firebox, length	120 $\frac{1}{2}$ in.
" width	12 $\frac{1}{2}$ in.
" depth	77 in. B. 73 $\frac{1}{2}$ in.
" material	Carnegie steel
" plates, thickness, sides	
" $\frac{1}{8}$ in. back, $\frac{1}{8}$ in. crown, $\frac{1}{8}$ in. tube sheet, $\frac{1}{8}$ in. front, $\frac{1}{8}$ in.; sides, $\frac{1}{8}$ in. and 4 in;	
Firebox, crown staying	back, $\frac{1}{8}$ in. and 4 in.
" stay bolts	Radial stays $\frac{1}{8}$ in. diam.
Tubes, material	Charcoal iron, No. 12 B. W. G.
" number of	332
" diameter	2 $\frac{1}{4}$ in.
" length over tube sheets	14 ft. 6 in.
Firebrick, supported on	Studs
Heating surface, tubes	2,819.34 sq. ft.
" water tubes	sq. ft.
" firebox	206.51 sq. ft.
" total	3,025.85 sq. ft.
Grate	35.0 sq. ft.
" style	Rocking, R. R. Co.'s style
Ash pan, style	Hopper, dampers front and back
Exhaust pipes	Single
" nozzles	$\frac{5}{8}$ in., $\frac{5}{8}$ in., $\frac{5}{8}$ in., dia.
Smoke stack, inside diameter	
" top above rail	14 ft. 11 in.
Boiler supplied by two injectors, Ohio No. 10 R. S., Monitor No. 10 L. S.	
Tender.	
Weight, empty	39,650 lbs.
Wheels, number of	8
" diameter	33 in.
Journals, " and length	5 in. dia. x 9 in.
Wheel base	15 ft. $\frac{1}{4}$ in.
Tender frame	Channel iron
" trucks	4-wheel channel iron, center bearing F. & B.

main entrance, at the corner of Cove and Summer streets, we pass at once without steps and with an imperceptible rise of about 3 ft. in 100, into the great "midway" lying across the ends of the stub tracks. This midway has also a general rise of 1 ft. toward the tracks, which are 5 ft. above the street level. Near the center of the midway are provisions for stairways leading down to the platforms on the lower floor.

The surface stub tracks, 28 in number, and at a grade of 5 ft. above the sidewalk outside, are arranged in pairs, with a passenger platform to each pair, and between the pairs are seven platforms devoted exclusively to the trucking of baggage and express matter, which serve 14 tracks, and are reached by electric truck lifts from a subway under the tracks leading from the baggage room on Cove street. The train shed is in three spans, with a roof of one sweep.

The present Old Colony drawbridge will be used until such time as the new six-track rolling lift Fort Point channel drawbridge is completed. This will require from three to six months.

The total length of the five-story front of the headhouse is 875 ft.; of the two-story building along Atlantic avenue (Cove street), 356 ft.; of the two-story building on Summer street, 234 ft.; on Dorchester



A Twelve-Wheel Compound Locomotive for the Southern Pacific Co.—Schenectady Works.

pressure carried is what is known now as "high pressure." The specifications for these pipes say that every pipe weighing more than 224 lbs. will be rejected.

A Schenectady 12-Wheeler for the Southern Pacific.

The engraving from a photograph shows an immense 12-wheel compound locomotive recently built by the Schenectady Locomotive Works for the Southern Pacific Company, of California. This is one of a lot of 10. It will be observed that it has even larger cylinders than the Schenectady compound consolidation engines built for the Northern Pacific, which were described in our issue of July 29. The cylinders of the Southern Pacific engines are 23 and 35 in. diameter by 32 in. stroke. Those of the Northern Pacific were 33 and 34 in. by 32 in. The descriptive specification follows:

Descriptive specification of a Schenectady 12-wheel locomotive for the Southern Pacific Co.:	
Weight in working order.....	192,000 lbs.
" on drivers	155,000 lbs.
Wheel base, driving.....	15 ft. 6 in.
" total	26 ft. 5 in.
Diameter of cylinders	23 in. and 35 in.
Stroke of piston	32 in.
Horizontal thickness of piston.....	$\frac{5}{8}$ in. and $\frac{1}{8}$ in.
Diameter of piston rod	$\frac{3}{4}$ in.
Kind " packing	Cast iron rings
" rod packing	Jerome metallic
Size of steam ports.....	H.P. 20 x $\frac{1}{2}$ in. L.P. 23 x $\frac{1}{2}$ in.
" exhaust ports.....	H.P. 20 x 3 in. L.P. 23 x 3 in.
" bridges	$\frac{1}{8}$ in.
Slide valves	Allen-American
Greatest travel of slide valves.....	$\frac{6}{8}$ in.
Outside lap "	H.P. $\frac{1}{4}$ in. L.P. $\frac{1}{2}$ in.
Inside Clearance, H.P. $\frac{1}{4}$ in. L.P. $\frac{1}{2}$ in.	
Lead of valves in full gear.....	in.
Kind of valve stem packing	Jerome
Diameter of driving wheels outside of tire.....	55 in.
Tire held by	Cast steel
Driving box material, Main, cast steel. Intermediate, F. & B. steamed cast iron	
Diameter and length of driving journals, 9 in. dia. on main only, $\frac{8}{2}$ in. dia. x 10 in.	
Diameter and length of main crank pin journals, Main side, 7 in. $\frac{5}{8}$ in. $\frac{6}{2}$ in. dia. x 6 in.	
Diameter and length of side rod crank pin journals, Inter. $\frac{5}{8}$ in. x 5 in. Front and back, 5 in. dia. x $\frac{3}{4}$ in.	
Engine truck.....	4-wheel swing bolster
" journals	6 in. dia. x 10 in.
Diameter of engine truck wheels	28 in.
Kind " Krupp No. 3 cast iron spoke center	
Boiler, style	Extended wagon top
Outside diameter of first ring .....	.72 in.
Working pressure	200 lbs.
Material of barrel and outside of firebox, Carnegie steel	
Thickness of plates in barrel and barrel and outside of firebox, $\frac{1}{8}$ in., $\frac{1}{8}$ in., $\frac{1}{8}$ in. and $\frac{1}{8}$ in.	
Horizontal seams, Butt joint sextuple riveted, with well strips inside and outside.	

avenue the building continues 725 ft., two stories high. The total length of the front on three streets is 2,190 ft. From Atlantic avenue there is a secondary entrance to the station, and an entrance to the subway. Beyond these entrances, along Atlantic avenue, the first story is the outward baggage room, with doors all along the street, protected by an iron and glass awning, wide enough to shelter baggage teams as well. On the Summer street front the waiting room is marked by large arched window openings, and beyond is the main exit, a wide thoroughfare at the end of the waiting room, and reaching Summer street by a bridge over the inclined exit from the subway. The subway exit is under the ground floor exit, and the inclines lead to the street. Beyond the main exit the building is but two stories high. At the corner of Summer street and Dorchester avenue is the carriage concourse. Beyond the carriage way, on Dorchester avenue, is another entrance to the subway, and the long room for inward baggage. On the Summer street facade the incline from the subway, the exit and the sidewalk are well protected by a great awning of iron and glass 40 ft. wide. On Dorchester avenue the baggage room doors and the teams are also protected by an awning.

Arc lamps are placed under all the awnings. In front of the entrance, in the center of the sidewalk island, there is placed a monumental granite lamp-post, 43 ft. high, to carry several arc lights. The entrance itself is a thoroughfare 92 ft. wide, lined with polished Stony Creek granite. Four great columns of polished Milford granite 40 in. in diameter, support the floors above. The ceiling is of white enameled bricks, with girders incased in white marble. The outward baggage room is 562 ft. long and 26 ft. wide. The ticket office has 11 sales windows toward the midway, and 16 openings on the opposite side into the waiting room.

The waiting room is 225 ft. long, 65 ft. wide, 28 $\frac{1}{2}$ ft. high, and out of the line of traffic. On the north side the room is lighted from Summer street. The roof of the midway is placed low enough to admit light on the south side of the room. The floor is of marble mosaic. The walls have a high dado of enameled bricks and a polished granite base—above the dado the walls are of plaster. There are three great doorways of polished Milford granite, and two verde antique marble drinking fountains. The room has a rich modeled stucco coffered ceiling, with beams 4 ft. deep. The women's room is 34 ft. by 44 ft., with lounges, and for children, cribs and cradles. Adjoin-

Opening of the Boston Terminal.

The new South Union Station of the Boston Terminal Company, which has been building during the last two years for the use of all the railroads entering Boston from the south, was opened for the use of the Old Colony and the New England railroads on the morning of the first day of January. (The trains of the Boston & Providence and the Boston & Albany will not use the new station for several months yet, the laying of the tracks to connect these roads with the Terminal having necessarily to be postponed until after the old station of the Old Colony is abandoned.)

On the afternoon of Friday, Dec. 30, dedicatory exercises were held in the main waiting room of the station. President C. P. Clark, of the New York, New Haven & Hartford, made an address, in which he recited the events that led up to the building of the station, introducing Mayor Quincy at the close. The Mayor expressed his satisfaction at seeing the completion of the building which he had himself first suggested on assuming office three years ago. He spoke of it as one of the finest examples of a passenger terminal to be found anywhere in the world.

The new station is situated at the corner of Summer street and Atlantic avenue. Dorchester avenue lies between the station and Fort Point Channel. Descriptive articles concerning the station were published in the Railroad Gazette of Jan. 1, Jan. 8 and July 9, 1897, and May 6, 1898. Supplementing these articles we give below some extracts from a full description of the station which has been sent to us by Mr. George B. Francis, Resident Engineer of the Boston Terminal Company.

The new south terminal station will be not only by far the largest railroad station in the world, but with the "loop track" on the lower floor, will be about double the capacity of any other. Entering at the

ing the women's room are a free lavatory and a pay lavatory. East of the main exit, and facing the midway, is the lunch room, 67 ft. by 73 ft., with marble mosaic floor, and wainscoted with enameled bricks. Beyond, and at the corner of the lunch room, is a stair and elevator hall to the dining room on the second floor. The kitchen and a room for private use of employees, and a directors' dining room, are also on the second floor. Next, facing the midway, are the station master's room, barber's room, shoe polishing room and smoking room, with a free lavatory. Last in the row is the passenger and baggage transfer office, next to the carriage concourse, which is at the end of the midway. Cabmen have a room opening into the carriage way only. The east side of the train shed is flanked by the room for inward baggage, 507 ft. long and 26 ft. wide. In the basement a part of the subway is under the building; there are rooms for emigrants, for baggage storage and for restaurant supplies.

The building above the first story is used for offices and employees. Conductors and trainmen have rooms

A large sump well has been built near the power house, in which centrifugal pumps pump away any possible seepage and storm water, which, owing to the grades of the suburban tracks, will necessarily be carried to the lower levels. There are some 14 acres of roofs from which storm water and melting ice and snow are carried away by many large conductors, the freezing of which in winter would cause great inconvenience. Special provisions have, therefore, been made to keep them constantly open and free from ice, by suitable hot water and steam supply. The power work, heating, refrigerating, etc., was all designed by Westinghouse, Church, Kerr & Co.

There will be about 700 trains transferred to the new station from the old ones. An actual count at the old stations indicates about 4,000 movements in 18 hours each day through the switches at the old stations. It is believed that the arrangement of tracks at the new station is simple and ample. By it, the station may be operated as a unit, incoming trains on one side and outgoing trains on the other side, or

6-in. splined hard pine planks, in about 40-ft. lengths, in many places doubled to give sufficient lateral strength to resist pressure from open water. From the very start there has been no flooding of the lower floor, the cofferdam having effectually done its work. The cost of this dam has been about \$75,000. It is also of use in connection with the permanent shutting out of high tides, thus reducing excessive pressure on the waterproofing.

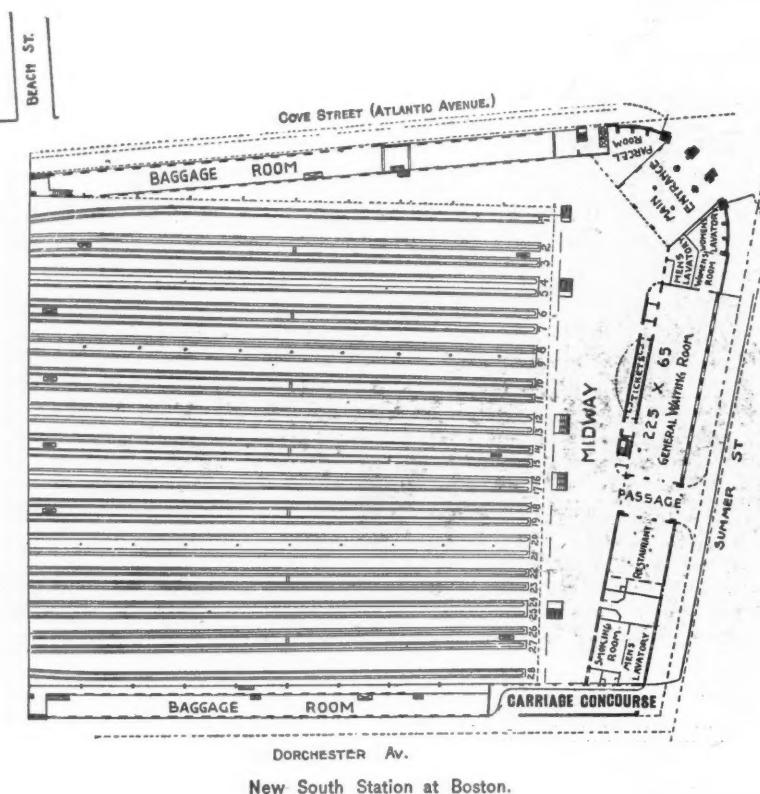
The permanent waterproofing sheet which underlies the whole lower floor consists of 10 layers of tarred paper, swabbed together with hot coal tar pitch. The layers are carefully lapped, and all built in place. This continuous sheet of waterproofing, amounting to 56,000 sq. yds., or upwards of 10 acres, is laid, where horizontal, upon a concrete base. On vertical walls it is backed up with 8 in. of brick work. The waterproofing was described, with drawings, in the Railroad Gazette, May 6, 1898. The water has been more effectually shut out than was ever expected. . . . The first steel was received in Boston, April 1, 1897. In all 900 carloads of steel were used. About 25,000 cu. yds. of excavated material from beneath the headhouse was carried away into the country at the start, but all other excavated material of the 275,000 cu. yds. handled has been used in the filling required around the terminal. . . . The only feasible method of interlocking for so large a plant seemed to be the pneumatic. The elevators are all electric, and so adopted largely on account of the disadvantages of puncturing the waterproofing sheet by hydraulic plungers.

The heating is by direct and indirect hot water. Hot water is forced around the basement of the buildings through main pipes about three-quarters of a mile long, which with the return makes a complete circuit. Steam could not be used as economically as hot water on account of some difficulty in getting the condensation back to the power house from the low points in the line, and because heat could not be so well stored as with hot water. Pipe subways have been built under the tracks through the yards for the accommodation of all the pipes and wires, and through them an underground journey can be made without trouble to reach any part of the line. The total horse-power of the plant is about 2,000. Room has been provided for about 50 per cent. increase. The granite used in the work has been brought from Stony Creek, Conn.; Milford, Mass.; Rockport, Mass.; Pigeon Cove, Mass.; Mt. Desert, Me.; Croachers Island, Me.; Deer Isle, Me.; Northbridge, Mass.; Fitchburg, Mass.; Pascoag, R. I.; Milford, N. H. In addition to this large quantities of granite from Quincy, Mass., found in the old work, have been used again.

The train shed is lighted through asbestos covered wire glass, bedded in putty, fastened in with wooden strips in wooden sash, fastened with brass screws to wooden frames, bolted to the train shed steel. All the glass is set vertically, and permanent foot walks have been provided so that it will be possible to reach each pane of glass in the shed at any time with brushes and water to keep them reasonably clean.

The main roof is an asphalt and gravel roof, the gravel being the white Long Island beach gravel. The monitors are covered with copper. The roof is designed to carry with perfect safety a uniformly distributed load of 60 lbs. per sq. ft., including its own weight, and several times this load before there is danger of rupture. The steel in the frame weighs about 23 lbs. per sq. ft., and the coverings about 10 lbs. more. It is not intended that it shall be necessary to shovel any snow from the main roof. All the down spouts are covered with jackets, and steam pipes have been run between the pipes and the jackets to keep them from freezing in the coldest weather.

The following statistics will afford a summary of the work: Total area of terminal land, about 35 acres; total area covered by building, about 13 acres; maximum length of main station, 850 ft.; maximum width of main station, 725 ft.; area of main station, 506,430 sq. ft.; area of awnings, outside of buildings, 46,000 sq. ft.; height of main station from sidewalk to top of eagle, 135 ft.; length of express buildings, 712 ft.; width of express buildings, 50 ft.; length of power buildings, 569 ft.; width of power buildings, 40 ft.; total length of buildings on street front, 3,300 ft.; length of train shed proper, 602 ft.; width of train shed proper, 570 ft.; height of train shed over all, 112 ft.; train shed in three spans, middle span, 228 ft.; two side spans, each 171 ft.; trusses, cantilever, and 60 ft. center to center; area of midway, 60,000 sq. ft.; area of connecting roofs, 17,500 sq. ft.; length of waiting room, 225 ft.; width of waiting room, 65 ft.; height of waiting room, 28½ ft.; total length of tracks, about 15 miles; total number of tracks entering the station, 32; of these, 28 are on main floor, and four in the shape of two loop tracks, on lower floor; length of tracks under roof, four miles; number of tracks through throat in yard, eight for main floor, four for lower floor; total weight of rail, 2,500 tons; number of double slip switches, 37; number of switches, 252; number of frogs, 283; number of semaphore signals, 150; number of signal lamps, 200; number of levers in tower No. 1, 143; number of levers in tower No. 2, 11; capacity of tracks in shed, main floor, 282 cars (65 ft. long); number of 40-ft. passenger cars that can be set against platforms on lower floor,



New South Station at Boston.

In the Dorchester avenue wing, and the remainder of the second story is occupied by the Boston Terminal Company. The entire third story is occupied by the Boston & Albany Railroad, and the fourth and fifth stories are occupied by the New York, New Haven & Hartford. The architects of the headhouse are Messrs. Shepley, Rutan and Coolidge.

The power and other engineering equipments were described in the Railroad Gazette of July 9, 1897. They are very elaborate, including not only heating and lighting, but also ice-making, air-compressing, apparatus for filtering and cooling drinking water, a fire protection service for the terminal buildings, a pumping plant for disposing of water which may find its way into the portions of the property situated below tide water, provisions for preventing the freezing of water in the leaders, which are to carry away rain and melting snow from the immense roof and train-shed areas. The switches and the signals are operated by compressed air. The signals are located in some cases on the ground level, but principally on nine signal bridges, varying in span from 50 ft. to 120 ft. The power plant is contained in a building 460 ft. long and 40 ft. wide, on the easterly side of the yard. There are in the station 19 electric elevators, five of which are for passenger service, two for freight and 12 for the handling of baggage between the upper and lower levels. Provision is made for heating and ventilating nearly 5,000,000 cu. ft. of space. Fresh air is supplied to the building by means of large fans, driven by electric motors in the basements, and drawn out of the buildings by means of electrically driven exhaust fans located in the attics. The main waiting room is warmed and ventilated by a separate set of fans, located in one of the principal heating chambers, of which there are several in the basements. In all the lavatories direct heat is provided, and entirely separate ventilating ducts, connected with a separate set of attic fans. In the ice-making and refrigerating plant 20 tons of "diamond" ice will be made each day, on the Westinghouse system.

The disposal of water from the large extent of water-proofed structure involved somewhat unusual considerations, as a large portion of the basements and all of the suburban loops are below tide water.

The main building is of pink granite from Stony Creek. To exhibit the immensity of the building, a diagram has been prepared showing how 24 prominent buildings of Boston could be founded within the area covered by the main structure. A list of these buildings is as follows: Mechanics' Building, City Hall, Public Library, Post Office, Exchange Building, Ames Building, Trinity Church, Old South Church, Old State House, Cadet Armory, Masonic Temple, Hotel Touraine, Hotel Vendome, original portion of present State House, Faneuil Hall, Faneuil Hall Market, Herald Building and the following minor building to fill the smaller spaces: Worthington Building, Carter Building, Faban Building, Y. M. C. A. Building, Hotel Copley, Hotel Austerfield, apartment house Le Brun.

On Feb. 5, 1897, a loading test was made to demonstrate the carrying capacity of spruce piles in the wet ground. This load was 60 tons of pig iron upon three spruce piles, driven 27 ft. into the ground, with a penetration of three to four inches at last blow of 2,000 lbs., hammer falling 16 ft., with the hammer line attached, and not exceeding 10 in. at any one blow for whole depth. Proposed final load, from completed structure, to be 50 per cent. of the test load, which latter gave no resulting settlement.

The cofferdam, without which it would have been impossible to execute the work, consisted of

loop station tracks, 60, all under roof; the seating capacity for the above cars is 28,104 people; capacity of express yard against platforms, 26 express cars, and 12 mail cars; total capacity of mail and express yard, 116 cars; capacity of other yard tracks, 93 cars, making a grand total of 613 cars.

In connection with the station there are 235 arc lights, inclosed pattern; 6,000 incandescent lights, 1,200 of which are in the main waiting room; 25 electric elevators, 209 water closets, 138 urinals, 118 set bowls, 5 shower baths, 106 fire supply outlets, 14 water meters, 29 storage vaults, 43 toilet rooms, 215 office rooms, 1,000 window shades, 200,000 lbs. sash weights, 120 connections for supplying Pintsch gas to cars, 36 ticket windows, 95 baggage room doors, 69 express building doors, 10 steam boilers, 4 electric generators, 9 compressors, 45 electric motors, 20 heating and ventilating fans, 25 steam engines and one traveling crane.

The material used to complete the work approximates: 43,000 spruce piles; 15,100,000 common brick, 487,000 medium brick, 346,000 enameled brick; 74,000 cu. yds. concrete, 32,000 cu. yds. stone masonry, 15,000 tons steel, equal to about 1,200 car loads; 200,000 cu. ft. of cut stone for building, or 500 carloads; 75,000 barrels Portland cement, 20,000 barrels Rosendale cement, 8,000 barrels coal tar pitch, 6,500 barrels prepared asphalt, 850,000 lbs. tarred paper, 450,000 lbs. sheet copper for roof trimmings, 500,000,000 ft. B. M., yellow pine timber, for various uses; 16,000 lbs. solder, 10 acres of gravel roofing, 150,000 sq. ft. wire glass, 40,000 lbs., or 20 tons, of putty to set the same.

The clock dial in tower is 12 ft. in diameter, and the granite eagle is about 8 ft. high, 8 ft. wide and 8 tons weight.

The Erie Canal.

Maj. T. W. Symons, Corps of Engineers, U. S. A., recently wrote to the Commerce Commission of New York, at the request of that body, a letter on the state canals, a few extracts from which follow:

In order to realize the benefits within a reasonably short time, the Erie Canal should be immediately improved in general accordance with present plans. Ample, convenient and cheap terminal facilities, devoted exclusively to canal traffic, should be supplied and maintained at Buffalo and New York.

All restrictive legislation upon the use of the canal should be annulled, and encouragement given to all responsible transportation companies, by affording them terminal sites upon nominal terms and for sufficient time to justify expenditure for improving the same.

If the Erie Canal and everything in connection with it were now as far in advance of the Erie Canal of 1865 as the great railroad lines are in advance of the railroads of 1865, it is very certain that there would be a tremendous business done upon it, and at rates lower than those possibly attainable by the railroads except at a loss, and New York City alone, of our seaports, would be the direct beneficiary thereof.

It is my opinion that under existing circumstances and prospects, the work undertaken by the state in improving the Erie Canal should be continued until the full result aimed at is accomplished. That is, until the prism of the canal is deepened for the passage of boats of 8 ft. draught and one tier of locks lengthened so as to permit the passage of boats 115 ft. long in pairs, each boat carrying about 400 tons, or about 13,500 bushels of wheat.

When the work now in hand is completed steps should be immediately taken to widen, deepen and lengthen the other tier of locks so as to permit the passage of boats of still larger size, say of 30 ft.

Improvements in hand by the state, which will necessarily take several years, it is my opinion that a great deal of good can be accomplished by the canal in its present condition if the terminal questions are properly looked after, and if all restrictive legislation be annulled and encouragement be given to transportation companies to transact business via the canal under modern business systems. With such systems of transportation inaugurated under existing canal conditions, they would grow and be perfected by the time the work in hand is completed, and the maximum benefits of the improvement would then quickly follow.

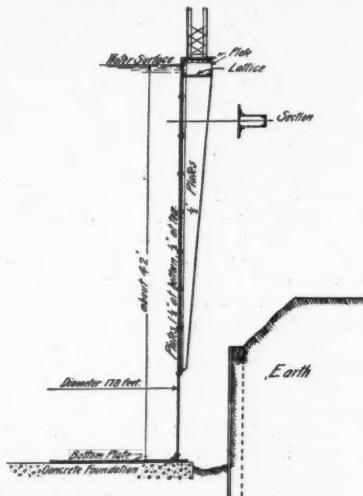


Fig. 1.—Part Section of Retaining Tank.

It is doubtful if any size canal would command business of great magnitude or exercise a maximum controlling influence on freight rates unless these features of terminals and unrestricted use are broadly looked after.

Why the Gas Tank Failed.

By George Rae, M. E.

In the numerous articles published about the failure of the large gas holder near Avenue A, between 20th and 21st streets, in New York, on the 13th of December, the causes of failure are guessed to be defective material or settling of inadequate foundations; or it is claimed that the appearance of the fractured plates indicates an explosion or shock of some kind. The latter is the opinion held by an official of the gas company, whose theory is that the uniform, cast-iron like fractures can only be accounted for by some sudden shock, which the water, being incompressible, transmitted equally to all parts of the retaining tank, thus causing all the fractures to be similar. He believed that the plates were up to the specifications.

A critical presentation of some plainly apparent defects in the design of the tank will demonstrate to the technical reader that there is no need of resorting to the explosion or shock theory to discover the cause of failure, nor to the equally unnecessary suppositions that the material used in the tank was defective, or that the foundation was inadequate and settled unevenly.

At the time of the accident the reservoir, or outer tank, had been filled with salt water from the company's main drawing from the East River, and the

this necessary increase in diameter, because its lower edge was rigidly connected to the unyielding bottom plate of the tank by a heavy angle riveted thereto. At the top the heavy lattice and plate stiffening girder likewise restrained the plates from assuming the larger diameter under stress. The consequence of this constraint at top and bottom would evidently be to throw a greatly increased stress on the intermediate plates, and if they stood the extra stress the sides of the tank would bulge out between the top and bottom instead of being straight, and near the top and bottom, especially the latter, there would be a dangerous shearing stress. It is to be noted that should the tank from any cause be stronger in one part than another the tendency to shear would be greatly increased in the weaker parts. Such a tank, even as a reservoir only, should have had substantial buttresses to guard against unequal straining. The tank in question was not buttressed in any way, although the heavy brackets supporting the columns of the superstructure have been so misnamed in previously published descriptions of the tank. The accompanying cut, Fig. 1, will clearly show the form and manner of connection with the tank of the so-called buttresses, and also the unsupported plates of the retaining tank from the bottom plate to the lower end of the bracket. They were in fact simple brackets supporting the superstructure.

The above reasoning will show that the tank as a simple reservoir could not be considered permanently safe. But in addition to acting as a reservoir the tank had to carry a heavy superstructure of columns and girders designed to guide and steady the gas tanks, the height of this structure being about 160 feet above the top of the tank or 200 feet above the foundation. The weight of this superstructure, together with the wind pressure on it, alone would have been sufficient to render the entire structure unsafe. In addition to this, at the time of failure the surface of perhaps half the gas holder was exposed to the wind pressure, and the weather records show for that evening from 4 till 6 o'clock a gusty northwest wind; average velocity, 29 miles per hour; maximum, about 42 miles. To show the importance of the strength of the wind at the time of the accident it is only necessary to say that the water tank had been filled for two days previous to the failure, and on both these days the force of the wind was practically negligible.

The fact that the tank had stood the water pressure for two days previous has been used as an argument that the tank was safe and the failure was to be accounted for only by an explosion. The only resistance to this wind pressure was the rigidity of the water tank as a cylinder of which the ratio of thickness to diameter averaged say 1 to 2,100.

The result of the combined stresses and the direction of the wind pressures was to subject the north-easterly side of the tank to a greater strain than the plates were designed to stand. The first rupture took place on the north side, and if the edges could be found would undoubtedly show considerable ductility in the material. Following this rupture, the lower plate sheared off the $\frac{1}{4}$ -inch rivets connecting it to the bottom plate, the stiffening girder at top gave way (due to insufficiency of rivets in splices), and the sides of the tank opened out like flaps. This opening out threw the columns of the superstructure inward, and the reaction from the outrush of water on the north side pushed the remainder of the tank in the

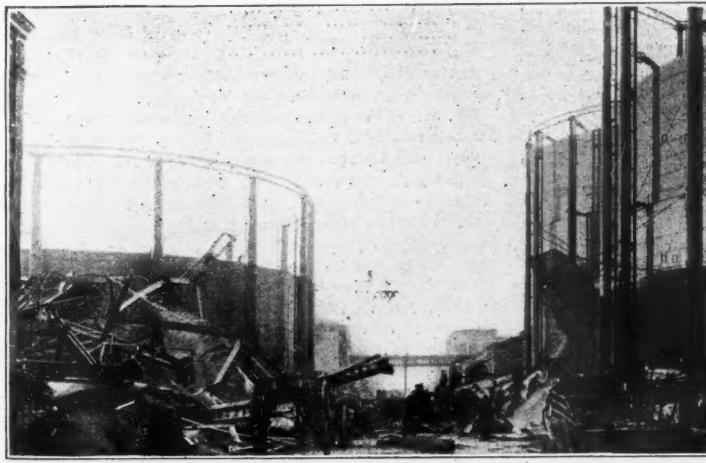


Fig. 2.—Gas Tank Failure—Looking West on Twenty-first Street.

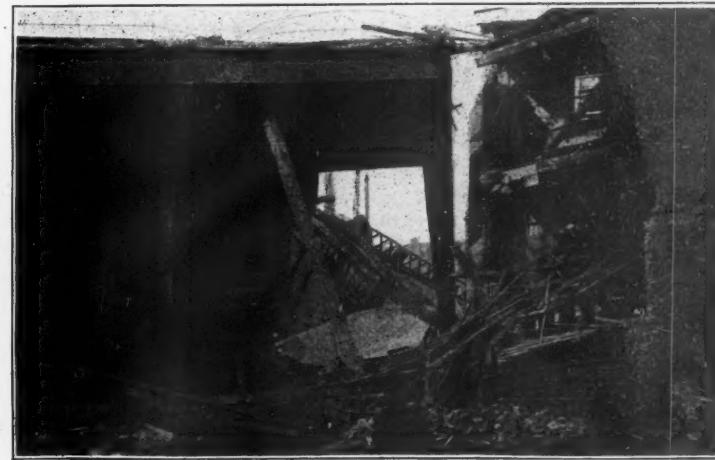


Fig. 3.—Gas Tank Failure—Looking North from Twentieth Street.

beam, 10 ft. draught and 200 ft. length, carrying about 1,500 tons, or 50,000 bushels of wheat each, and coincidently or following this, the prism of the canal should be deepened to a size suitable for the larger boats, making such changes in location and alignment as may be determined to be advantageous, and incorporating all improvements and labor-saving devices which may in the meantime be invented and found meritorious in any part of the world.

If it were possible to achieve the large-barge canal in the near future, I should be an advocate of proceeding with it at once; but this achievement does not appear very promising at present, and it therefore seems the part of wisdom to complete the inferior canal, on which \$9,000 has been expended, leaving the large canal to be provided for in the days to come.

But without waiting for the completion of the im-

proving gas tank was being filled, whether with air or gas will make no difference for the present purpose. The gas tank had been raised at least 25 feet, though it is claimed by some that the tank was half filled. When fully extended the top would be about 185 feet above the street.

Disregarding the superstructure for the present, and considering the water tank simply as a reservoir, the thickness of the plates was sufficient to stand the hydrostatic pressure safely, had the tank been free to preserve its cylindrical form under pressure. A simple calculation will show that the tank under pressure would be about 2 inches larger in diameter than when free. The lowest plate was incapable of yielding to

opposite direction, leaving the southerly side on the curb line of Twentieth street and likewise throwing the superstructure in toward the center, as may be observed in the ruins. Inspection of the bottom plate will show that, as far as it may be got at, the lowest plate either tore at the rivet holes or sheared the rivets holding it to the bottom plate. Nothing above offering resistance, the plates spreading out struck with a shock against the wall of the pit and resulted either in shearing the plates in horizontal lines or in causing them to tear in various directions. A point worthy of remark is that nearly every one of the brackets attached to the side of the tank which were left in place had torn out the lower two or three pairs of rivets

ets, while the upper ones remained intact, thus showing that the sides of the tank had curved out at the center, as indicated above.

There are many minor points of design which deserve criticism, but as the tank would still have been absolutely unsafe, even if these matters had been right, it is needless to discuss them now.

Briefly, the conclusions to be drawn from the appearance of the wreck and the information available are that the outer tank was designed without providing the bracing or stiffening which was necessary for the safety of the entire structure, and the lowest plate was subjected to a shearing stress due to being rigidly fastened to an unyielding bottom plate, and to a vertical stress due to upper works, neither of these stresses being provided for.

A question demanding grave consideration on the part of those whose duty it is to safeguard the lives of the citizens is brought up as a consequence of this accident. This structure was built in accordance with plans showing either incompetence or carelessness, and the plans were neither inspected nor approved by any city official, and it is also probable that no inspection of the work was undertaken by the city. The building department claims that the structure was out of its jurisdiction as being a piece of machinery. But when it is considered that the water tank to contain 8,000,000 gallons of water, mostly above the street level, and the superstructure, rising 185 feet above the street, were entirely lacking in any essentials necessary to class them as machinery, it would seem as though the department might at least have taken the responsibility of having this part constructed in such a way as would have prevented the loss of life consequent on its failure.

The position of the section of the retaining tank leaning against the gas holder on the opposite side of the street, as shown in Fig. 2, has been accounted for by assuming that it was thrown there by an explosion. A more reasonable inference would be that the tank, having ruptured first on this side, the wave of outrushing water (at first about 25 ft. high) tore this part away and carried it along. The brick wall of the yard and the masonry wall of the gas holder directly behind it, stopped this section just in time to prevent serious injury to the gas holder.

Fig. 3 shows the characteristic appearance of the fractures, and also the injury done to the adjoining buildings, due to the side of the tank being thrown against them. The bracket on the right was stopped by striking the outer wall of the building, while the mass of water broke through the plates and completed the destruction of the walls.

Fast Mail Trains to the Pacific Coast.

The time of the fast mail train leaving New York in the evening over the New York Central has been shortened so that the train will reach Chicago in 24 hours 15 minutes. It will leave New York at 9:15 and arrive in Chicago at 8:30. The corresponding eastbound train now leaves Chicago at 3 a. m. and runs through to New York in 25 hours 15 minutes. The fast mail trains leaving New York and Chicago in the morning are continued the same as before. Simultaneously with this change the time of the mail trains west of Chicago has been shortened, so that, with the closer connections, the time from New York to San Francisco and to Portland, Ore., will be 12 hours less than before. The time from Chicago to St. Paul is also to be quickened, and Montana newspapers say that the Great Northern will change the time of departure of its train from St. Paul, and will increase the speed, so that all the towns on the main line of that road will receive their eastern mails about 12 hours earlier than heretofore. Between Chicago and Council Bluffs, both the Chicago & Northwestern and the Chicago, Burlington & Quincy have quickened the time of their mail trains. On the first day of the new time-table, Jan. 2, the train of the last named road made the trip, 500.2 miles, in 612 minutes, equal to 49 miles an hour. The Northwestern train ran from Chicago to Council Bluffs, 490 miles, in 597 minutes, equal to 49½ miles an hour. Press dispatches say that the Northwestern made 18 stops and the Burlington 12.

The eastbound mail train of the Burlington, on its second trip, left Council Bluffs 62 minutes late, but arrived in Chicago on time, the running time, including stops, being 563 minutes, equal to 53.29 miles an hour. The actual running time, excluding stops (39½ minutes) was 523½ minutes, equal to 57.3 miles an hour. From Burlington to Chicago, 206 miles, the run was made in 213 minutes, including all stops. Thirteen minutes were required for stops, and, taking these out, the showing is that the actual running time for the 206 miles was 200 minutes, an average of 61.8 miles an hour.

On the Chicago & Northwestern, on the second day, between Arion and Arcadia, Iowa, on a straight level track for 15 miles, one or more miles were traversed in 35 seconds each.

The first westbound train out of New York on the new schedule was delayed, and left Albany about 90 minutes late; but it reached Chicago on time, 55 minutes being made up between Buffalo and Cleveland.

The Chicago Drainage Channel Litigation.

Within the last month the important litigation over the water power at Joliet has been brought to a close, while the injunction preventing the building of the Campbell avenue eight-track bridge, under the contract made with the Scherzer Rolling Lift Bridge Company, has finally been dissolved. With the settlement outside of court of the difficulties at these two points the Sanitary District is now free to proceed with the work, and efforts will be made to have the canal completed by October, 1899. Where possible the work will be carried on both day and night.

In the lower court the Illinois & Michigan Canal Commissioners were sustained in all important claims, so that the Sanitary District in the final compromise was obliged to make many concessions. The Illinois & Michigan Canal Commission is given right to use the entire water power created at Joliet, and to enable this power to be developed and to protect the canal the Sanitary District is obliged to build and maintain extensive works which will cost probably \$250,000; the Canal Commission also receives \$20,000 for the use of certain lands, and the Economic Light & Power Co., of Joliet, which at present leases the water power, receives \$12,000 for damage to its plant; the Sanitary District also pays the cost of the suit. What the Sanitary District gains is the removal of the last important obstacle to its right of way through Joliet.

In the Campbell avenue bridge case the Appellate Court rendered an opinion December 6 sustaining the lower court in granting a preliminary injunction to prevent carrying out the contract with the Scherzer Rolling Lift Bridge Co., but as an agreement has been reached out of court, the case will not be brought to trial and the injunction has been dissolved. The new bids on the Scherzer design alone (see December 2, p. 864) have been rejected unanswered, and the work will now proceed under the contract awarded August 6 to the Scherzer Co.

The M. C. B. Journal Box Lid.

In our issue of June 10th last we published a letter discussing the merits of the M. C. B. journal box lid; the conclusion then reached was that the principle upon which the M. C. B. lid is designed is wrong, and that a modification of the Fletcher lid is to be preferred, because of its flat contact surfaces making a tight joint possible between the lid and the box. The committee of the Central Railway Club, consisting of Messrs. H. C. McCarty, J. R. Petrie and C. J. Butler, which reported on the subject of journal box lids at the November meeting, seems to have reached the same conclusion. Some extracts from this report follow:

The form of the M. C. B. journal box lid is wrong in principle, and consequently under the usual methods employed in making and fitting freight car journal boxes and lids it is difficult if not impractical to secure a close fitting lid, as the face of the lid and box are irregular in their form. Further, the action of the lid spring results in pressing the top portion of the lid away from the box. This condition is logical when it is considered that a freight car journal box is a rough casting and the M. C. B. form of lid consequently cannot fit it closely, owing to this and the irregular form as referred to and the general rough character of the box and lid.

In the opinion of your committee a careful consideration of the question would result in a conclusion that the most economical form of journal box would be one having a perfectly flat surface for the lid to rest upon, and where the action of the spring would be most effective. These features, it can be said, are all embodied in the form of lid known as the Fletcher. This lid, however, as commonly made, has gained a bad reputation on certain railroads, owing to a failure to properly support the lid at its bottom edge, resulting in the lid wearing down to the extent of causing an opening over the top edge of the lid. This objection can be entirely avoided by providing a quarter inch projection at the lower edge of the box and also turning the edge of the lid to correspond to this, thus forming a quarter inch bearing between the lower edge of the lid and the ledge on the box. This, it will be seen, will entirely remove the objection referred to. In this connection we desire to call attention to another feature of the Fletcher form of lid that should be considered. It, of course, is well understood that the speed of a train stirs up much dust and dirt, which beat upon the forward sides of all journal boxes with considerable force, and any joints between the box and the lid exposed to this action would be affected to a greater or less extent, as will be understood by a little consideration of the conditions stated. This has been overcome by hanging the Fletcher lid at the top instead of the side, and forming a ledge or rib on each side of the box which effectually resists the action of the dust and dirt driven against the sides of journal boxes, as with this construction there are no exposed joints on the sides of the boxes.

The effect of a close fitting lid on the economy of lubrication would, without any statistics, indicate a very desirable construction for any railroad to use. By a comparative trial on passenger cars, however, extending over a period of one and a half years, it was shown that boxes with close fitting lids required 50 per cent. less oil and packing than boxes with the M. C. B. form of lid. This increase in oil and packing in boxes fitted with the M. C. B. form of lid was considered as due to the admission of dust and dirt to the boxes, thus causing a greater wear of the bearing and journal, and consequent heating from the presence of dust and dirt; also the increased number of bearings removed on account of running hot, owing to the conditions described, results in a proportionate increase in oil and packing, in addition also to the necessity of the occasional renewal of small portions of packing on account of it becoming too gritty to continue in use. One form of lid in this comparative test was a cast iron sliding lid,

fitting ledges on each side of the box which, as well as the lid, were machine fitted by an economical process. This form of lid gave better results than the Fletcher. It should be stated, also, that this sliding lid is not a new form, but has been in use in passenger service for at least 30 years on a railroad where the conditions are most severe in regard to sand and dust. During this long period this lid has shown a saving of over 50 per cent. in the amount of care required in oiling and packing the boxes, as well as an equal saving in the quantity of oil and packing used, as compared with the M. C. B. lid in the same service.

This test also clearly showed a great saving in the wear of the journal, both in diameter and end wear, also in the wear of the journal bearing, the tight fitting lids showing a reduction of wear on the parts referred to of 50 per cent. and in many cases greater, as compared with the wear on the journals and bearings in boxes fitted with the M. C. B. form of lids. The cause for this reduction in the wear of the lubricated parts is attributed almost entirely to the exclusion of dust and sand by the tight fitting lids.

In conclusion, the committee does not consider the M. C. B. lid as meeting the requirements for the complete exclusion of dust and dirt, and has no hesitation in saying that there are features of other lids heretofore explained that bring the lid in closer conjunction with the box and thus effectually exclude dust and dirt.

It is therefore the desire of the committee to recommend what it considers the proper principle of a dust proof lid and not necessarily recommend any specific lid, as it will be found by the use of a lid embodying the principles heretofore explained that the economical results referred to in the report can be secured.

Sault Ste. Marie Canal Traffic.

The report of traffic through the canals to and from Lake Superior, which was published in the Railroad Gazette for Dec. 23, was for the season to Dec. 1 only. We have since received the official report for the complete season, from which we take the following figures:

Items.	U. S. Canal.	Can-a- dian Canal.	Total, 1898.	Total, 1897.
Vessels.....	14,038	3,703	17,761	17,171
Lockages.....	7,006	2,325	9,333	8,571
Tonnage, net registered.....	15,871,609	2,751,145	18,622,754	17,619,933
Freight tons of 2,000-lb. weight.....	18,184,151	3,050,513	21,234,664	18,982,755
Passengers.....	27,558	15,868	43,426	40,213
Coal (h.-rd), net tons.....	465,188	75,655	540,843	536,199
Coal (soft), net tons.....	2,669,904	563,703	3,235,607	2,02,973
Flour, bbls.....	6,917,025	861,018	7,778,043	8,921,143
Wheat, bu.....	52,693,452	9,646,544	62,339,996	55,924,302
Grain (other than wheat).....	22,950,940	3,127,444	26,078,388	24,889,688
M'f'd and pig iron, tons.....	237,150	13,020	250,170	135,164
Salt, bbls.....	271,783	29,777	301,560	285,449
Copper, tons.....	118,403	5,823	124,226	122,324
Iron ore, tons.....	9,841,124	1,865,836	11,706,960	10,633,715
Lumber, M. f. t., B. M.	885,176	10,309	895,485	805,612
Other freight, tons.....	548,929	78,887	627,816	585,302

Of the vessels locked this year there were: Steamers, 12,461; sails, 4,449; unregistered, 851. Commerce passed through canals 238 days during 1897, and 248 days during 1898.

The Year 1898 and a Forecast.

The New York Times published on Monday a supplement containing special articles by many different people who are authorities in various fields of trade and finance, reviewing somewhat the records of 1898 and making a forecast of 1899. Mr. H. Allaway gives the following figures of yearly transactions in stocks and bonds on the New York Stock Exchange:

Shares.	Bonds.
1898.....	\$918,028,710
1897.....	544,569,930
1896.....	394,329,000
1895.....	519,142,100
1894.....	352,741,950
1893.....	301,393,777
1892.....	502,507,000

Active shares of the Stock Exchange list show an advance beyond \$600,000,000.

Mr. A. L. Wilson, financial editor of the London Daily Standard, writing from London, says that the output of gold from the mines of the world in 1898 will probably exceed £50,000,000. This new gold, together with the steady purchase by the Americans of their own securities, has kept the European money markets comparatively strong in spite of wars and of their enormous indebtedness to America. He looks forward to a very busy year in all branches of trade and industry. With peace nothing can stop the movement now manifesting itself. Production was never more active, and Mr. Wilson thinks that the gold produced in 1898 may be even more effective in stimulating industries than it has been in any other recent year. He thinks that an outburst of speculation is upon us.

Mr. William E. Bear, the great authority on the world's wheat production, says that the crop of 1898 was undoubtedly the greatest on record. Great Britain produced more than in any other year since 1885. The yield per acre was 34½ bushels. France had the greatest crop of any year since 1874, and it was only 600,000 bushels less than the crop of that year. In the Russian Empire the wheat crop was the greatest ever grown in that country. In Austria-Hungary the crop was greater than that of 1897, but has often been exceeded. The German wheat crop was considerably above the average, while that of Italy was fair. Mr. Bear's estimates are:

United Kingdom.....	75,000,000
France.....	360,000,000
Russian Empire.....	456,000,000
Austria-Hungary.....	164,000,000
Germany.....	110,000,000
Italy.....	113,000,000

The total world's crop is estimated at 2,567,000,000 bushels, or about 5,000,000 more than the best previous record—that of 1894.

The Washington correspondent of the Times estimates the domestic exports as of much the greatest amount ever reached. The exports of breadstuffs, provisions, etc., have been larger in value than ever before, as have also the exports of cotton, and in iron and steel they were nearly 33 per cent. more than in 1897. These figures are subject to correction, as December is estimated.

Mr. Carnegie thinks that the year opens with more favorable signs of prosperity for the industries based upon steel than any former year within his recollection. He says: "All that the Republic needs now to become the world's source of supply for steel is peace, security, freedom from war and from disturbing rumors of war, that are almost as prejudicial as war itself."

Mr. Charles Kirchoff, editor of the Iron Age, thinks that conditions foreshadow another great boom period. He says that the iron industry never before stood on the threshold of a new year with brighter prospects. Pig iron and rails are heavily sold at low but remunerative prices, and the capacity of the producers will be strained for six months to come.

Mr. Callaway, President of the New York Central, says that since he was a boy he has not known the railroad outlook to be better than it is now. With him it is only a question of getting cars and engines.

Mr. A. M. Shook, General Manager of the Tennessee Coal and Iron Company, thinks that 1899 will be a record breaker and the banner year of the nineteenth century.

An Old Reading Engine.

By C. H. Caruthers.

On the 14th of August, 1844, the Philadelphia & Reading Railroad Company placed in service an engine named "Richmond"; and on the evening of Sept. 2, just 19 days later, this engine exploded its boiler, while running, at a point about two miles from Reading, Pa., killing four of the crew and badly wrecking the engine.

The "Richmond" was originally built for freight service, from designs by Tredgold, at the Norris Locomotive Works in Philadelphia. The boiler was

than to the back one. The recesses in the webs which formed the sort of half saddles by which the cylinders were attached to the boiler, were occupied by the pumps. It was thought this location was especially adapted to keeping the pumps from freezing in cold weather, but the sequel proved that the great heat from the naked cylinders and smokebox, combined with the long suction pipe, produced an excess of goodness which was disastrous. The check valves were on the sides of the boiler, just back of the front tube sheet. A rather simple mode of producing a variable exhaust was used. The top of nozzles terminated in a conical casting, with the smaller end or opening uppermost. Inside of this a smaller cone was raised or lowered by a crank worked from the footplate, thus increasing or diminishing the size of the discharge. The only trouble found with this was that unless used considerably it soon became clogged with the combined deposits peculiar to its location and was then probably worse than useless.

The second and third pairs of drivers carried their proportion of the weight in a peculiar manner. Above the frames on each side large springs were placed, one to a side, midway between the two drivers, the centers of springs rigidly fastened to frames and the ends resting in arms which were hinged at their other ends to the frames. The usual posts resting on top of the driving boxes pressed with their upper ends against the under sides of these hinged arms about midway between their ends. The front driving wheels were fitted with one spring to each driving box, placed above the frame.

The smokestack was of the French and Baird type and worked well when kept clean. A large square sandbox was fixed on the boiler just behind the smokebox.

The footplate was protected by a cab of a rather open type. The front was closed, but the sides were open half way down from the top. The open space could be closed in storms by canvas curtains hung from the roof sides. The whole arrangement was similar to the original cab of the Winans Camel. It is possible that this cab was only placed on the engine when rebuilt after the explosion, as the testimony of witnesses in regard to a thunderstorm prevailing near the time of the disaster was that they were certain the rain had ceased, as the engineman

After the wreck the engine was taken to Norris' shops and rebuilt as the "Philadelphia."

The tender of this engine was 8-wheeled, first two pairs in center-bearing truck, and rear two pairs in rigid pedestals attached to frame of tender. Between these latter pairs brake blocks were hung, and between these blocks a shaft extended across the tender. Arms attached to this shaft between the blocks caused the application or release of the brake blocks, as the long lever from end of shaft to top of tender was raised or lowered.

The only lagging used on the Richmond was on the barrel of the boiler. It was of wood, without any sheet-iron casing, but was painted, and also was held in position by several rings or bands of brass. Some of the principal dimensions of the Richmond were:

Cylinders	15 in. x 20 in.
Drivers, diam.....	.44 in.
Firebox, length.....	.38 in.
" height .....	.47 in.
" width .....	.36 in.
Boiler, dia.....	.38 in.
Tubes (131).....	1½ in. dia. x 11½ ft. long
Wheel base.....	.8 ft. 3 in.
Center of boiler from rail.....	.55 in.
Weight, about.....	.38,000 lbs.
Length over all.....	.23 ft. 3 in.
Stack, top from rail.....	.13 ft. 6 in.

The McHenry Track Tools.

The Sheffield Car Co. are making a couple of improved track tools, namely, the McHenry track gage and the McHenry involute track level. These are the inventions of Mr. E. H. McHenry, Chief Engineer of the Northern Pacific Railroad.

The McHenry gage answers as well for curves as for tangents, making it unnecessary to carry an extra tool. It is provided with five steel shims, $\frac{1}{8}$ in. thick each, which are used for gaging on curves. On tangents they are held up out of the way by a simple clamp. On curves one shim is turned down for each increase in curvature of three degrees, and the five shims together allow gaging for curves up to 15 degrees. On transition curves an additional shim is turned down for each three degrees of curvature progressively until the maximum is reached.

The involute track level is provided with a blade of hardened tool steel carefully ground to an involute curve, which blade is slotted into one end of the level, so that its lowest portion is always in contact with the head of the rail. By this blade the level can be raised to the full limit of six inches in super elevation of that amount, still keeping the contact point always in the same relative position on the rail. These conditions can only be met by applying the principles of the involute curve, hence the name of the level. Each side of this plate, or blade, is graduated, and it can be clamped in any position.

This level and gage have been used on the Northern Pacific Railroad for some time, and patents are applied for.

Notes on Russian Railroads.

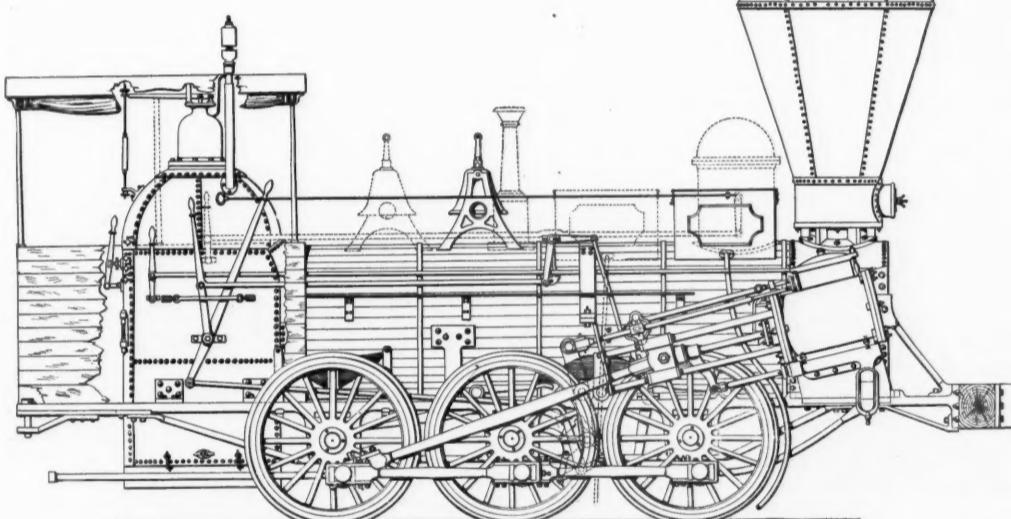
The Russian railroad report gives the number of journeys made on free passes in that country, which, in 1895, was 2,202,929, and one man traveled on a pass to every 25 who paid. This was only one-third of the free travel, however, for nearly four millions of journeys by soldiers, and nearly half a million of prisoners paid no fares. Altogether, there was one non-paying passenger to every eight who paid.

As in most European countries, few passengers travel first class in Russia; in 1895 only 1½ per cent. of the whole number, while nearly 10 per cent. had second-class tickets, 83 per cent. third-class, and the remainder fourth-class. The latter class is only for laborers making long journeys, like harvest hands, who go hundreds of miles to South Russia and follow the harvest north back to their homes, and for emigrants, who, of late years, are going in considerable numbers to Siberia. The whole number of emigrants carried in 1895 was 233,015.

The average passenger rate in Russia under the tariff recently introduced is, we think, the lowest in Europe. In 1895 it was 0.65 cent per passenger-mile; but as one-ninth of the passengers were carried free, this does not represent the average fare of paying passengers. If the average journey of the non-paying was the same as that of the paying passengers, the average rate of the latter was 0.73 cent per mile, which is certainly very low. The average journey was 78 miles, which is very much longer than in most countries.

Foreign Railroad Notes.

In 1871, just after the war with France, the "German Private Railroad Union" (at that time the State Railroads had the smaller part of the railroad mileage in Germany), presented to Prince Bismarck an elegant private car and perpetual free transportation for it on all their lines, and similar free transportation was granted by the State Railroads of Prussia and of several other German states. The Private Railroad Union undertook also to keep the car in repair. The car now becomes the property of Prince Herbert Bismarck, but naturally he has no privilege of free transportation, so that it seems something like a white elephant.



A Philadelphia & Reading Engine of 1844.

fitted with a firebox and a dome of Bury type, and had a square smokebox, to the sides of which, set very high, the cylinders were fastened through the medium of plates and webs cast with the cylinders.

The frames were of bar type, and contained three pairs of coupled wheels set closely together between the smokebox and the firebox. The eccentrics were four in number, placed on the rear axle, and their rods terminated in V hooks connected by short hangers to a tumbling shaft hung underneath the frame. The independent half-stroke cut-off was of the type generally used by the Norris firm. Its valve worked directly on the top of the full-stroke valve. The rod was hinged a short distance outside of the steam-chest and ended with a double V hook, whose upper notch engaged the pin of cut-off rocker when in use, and whose lower notch engaged a pin on main valve stem when cut-off was not used. The rocker for cut-off was worked by a long rod attached to a pin set in the side of the forward eccentric strap at such a point as to produce the desired cut-off. The tumbling shaft to control use of this cut-off was placed upon the top of the boiler. The guides were round, and it is probable that the crosshead was fitted with glands containing washers of sole leather, as this was a favorite plan with Norris at that time and was substantially used by Mr. Millholland for years on engines designed and repaired by him.

The cylinders stood at quite an angle, and had the steam chests set somewhat nearer to the front head

had removed his waterproof coat before starting. This would indicate an open footplate.

The solid lines of the drawing show parts of engine and their position when built at first. The dotted lines show parts added after explosion, and also the new position then given to some of the older parts.

The lock-safety valve was then added. Its valve was held down by a number of small elliptic springs contained in the square part of the casing. The small dome forward is a still later addition by Mr. Millholland, about 1849. The throttle was transferred from the Bury dome to it and an internal dry pipe connected these domes.

The explosion referred to having occurred in a comparatively new engine and in days when such things were not common, seems to have attracted unusual attention. The Franklin Institute appointed a committee of investigation, and in Vol. 9, series 3, 1845, page 16, there is a very full account of the occurrence. It seems the engine had given considerable trouble from sticking of pump valves, and such trouble had been experienced on the fatal trip. The uninjured tender was found with valves to both pumps open, strong evidence of an attempt to overcome unusually low water in the boiler. The committee of the Franklin Institute decided that the explosion was caused by the water having left the plates (crown sheet probably meant) and then rushed back upon them when heated, thus generating a pressure beyond what the boiler could bear.



ESTABLISHED IN APRIL, 1856.
PUBLISHED EVERY FRIDAY,
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisments.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

A city of more than 200,000 people, within 90 miles of the United States, and which in the last years of the nineteenth century is far filthier than Constantinople, filthier probably than any great city of Continental Europe was 200 years ago, is inconceivable. And yet it exists, and the United States is henceforward responsible for its health. If anyone thinks that we are putting the case extravagantly let him read the report on Havana made by General F. V. Greene. He will discover a tropical city, with no sewers, with cesspools in the houses, open drains in the streets and the offal of the one city slaughter house rotting in a creek within the town. General Greene is an engineer and a man of affairs, and as far as possible from being a sensationalist. He tells the simple facts as he saw them; that is quite enough. It shows that General Ludlow and Colonel Black have on hand a job about as big as the military conquest of Cuba itself. Fortunately, those gentlemen, too, are engineers, and they have had an important municipal experience, and by training and character they are well qualified to handle the task which they have undertaken. The fact that such men have been sent to Havana and that General Wood is in command at Santiago is pretty good evidence that the President understands the most difficult part of the Cuban undertaking and that he is disposed to set good men to handle it. There is a grave question, however, as to what Spanish methods may intervene between the President and the officers who are actually in Cuba. Unfortunately, the War Department comes in there, and it seems as if Weyler himself might learn something in his own chosen field of enterprise from our War Department.

American Trade and Policy in China.

The letter printed below is a personal letter to the editor of the Railroad Gazette, but it contains information and suggestions of importance to many of our readers, and for that reason, among others, it is made public, and used as the text for some observations which may perhaps bear a little fruit.

The writer of this letter is a gentleman whose name is known to nine out of every ten of our readers. For more than half a generation he has been famous for his military and civil courage, for his activity and for his zeal and devotion to the great interests of the British Empire. He has fought England's battles on the field and in Parliament, always with ardor and single-mindedness. To-day he is fighting her commercial battles in the same spirit. Of course, he exaggerates the importance of the work done by the man to whom this letter is written; but that work has been carried on now for 20 years by correspondence and conversation, by lectures and by occasional public writings, and has perhaps produced some result.

Now, the events of our little war suddenly bring into the same work powerful forces, and we may reasonably believe that the United States and Great

Britain will henceforward work together for the profit and glory of all the English-speaking people and for the ultimate good of mankind. Undoubtedly there must come rivalries and small quarrels between the two energetic and ambitious branches of the race, but we may hope that they will never again drift so far apart as they were 30 years ago.

"Shanghai, Nov. 19, '98.
"I have heard so much from my friend . . . of the excellent work you are doing in the States to promote good feeling between your people and ours that I feel obliged to write and compliment you on your efforts.

"I am visiting China, . . . and from all I have seen out here I am fully convinced that the solution of the China question lies in a strong commercial alliance between those countries interested in keeping the door open in China, as opposed to those countries whose interest it is to close the door, whether by preferential rights, by hostile tariffs, by military domination or by diplomatic pressure on the government at Pekin.

"The interests of the United States are so bound up with those of Great Britain in China that I am very glad indeed to see that American merchants out here are so well disposed toward joint action. At Newchwang, where I was the other day, I was astounded at the positions of advantage gained by Russia in Manchuria, and as American imports there are estimated at 50 per cent. of the whole of the import trade at this port, your people are as much interested as ours, in demanding to know what our position is to be and where the line is to be drawn.

"Hoping you will continue your excellent work, etc."

In the interests here spoken of the readers of the Railroad Gazette have a very great and direct part. There are railroads to be built in China. The Russian line through Manchuria, Mr. Kinder's lines to Newchang and to Peking, and to Pao Ting Fu, 80 miles south from Peking, and the little line from Shanghai to Woosung are the only lines now built or building, and are but the beginning of what must sooner or later be thousands of miles of railroad—how soon, depends much on political conditions to be mentioned later. These new railroads may, if we are wise, employ our money and the skill and energies of our engineers. They may provide a market for our rails and track material, contractors' tools, telegraph and water equipment, locomotives and cars, machine shop equipment, and, in brief, for all that goes to building railroads.

They may do all this or they may not, according to the wisdom and foresight of our rulers.

But railroads are only the beginning. Already an electric street railroad is close to the point of actual beginning in one great Chinese city. Perhaps the contracts are already made. But no man can foretell the rapidity and extent of the spread of electric railroads in the teeming cities of China. Following on these enterprises a market for iron-working and wood-working machinery and for coasting and river steamers will open up. Other materials than these we do not mention, for we are now confining our attention to those things which interest directly our own readers.

In order that this fertile market shall be open to our money, energies and products two great conditions must be fulfilled: A reasonable permanence and security of government must exist at Peking; we must have the same rights to trade and hold property in China that are enjoyed by the "most favored nation."

At this hour there is a good deal of doubt of the stability of the Peking Government. There is a grave question as to the life of any concessions, for railroads or other great enterprises, made before the recent displacement of the Emperor, or which may be made by the Empress Dowager. This is especially true of concessions to Americans, because our diplomatic policy toward Chinese questions seems to be unformed and irresolute, and there is natural doubt that we would protect American investments in China if we could, and doubt if we could protect them if we would. Certainly we could not alone protect them against Russia should Russia at any moment command China to nullify American concessions. Russia is the real concessionary of the railroad south from Peking to Hankow; the Belgian company is only a figurehead. And now we hear that even that concession is held up, if not revoked. The Brice concession is a continuation of that line southward from Hankow, and it would not be worth the paper it is written on if Russia wished to control the whole line, unless the United States Government, acting with some ally already strong in Chinese waters, should step in to protect the interests of their citizens. This illustrates the situation as to many of the possible concessions.

As to trade rights also it is not too strong an

expression to say that our situation is precarious. Russia controls Manchuria. She has taken Port Arthur, the finest and strongest naval station in the Far East, and will undoubtedly bring the Manchurian railroad to that port. She has already informed Russian traders that Port Arthur is a Russian port, free to Russian goods, but at which the goods of other countries must pay duties; a port at which Russian passport regulations are enforced, and to which Chinese ships can be admitted only if they are commanded by Chinese officers. Henceforth our trade with Manchuria is entirely dependent on the self interest and good will of Russia. These may favor us a month or a year or a decade; or they may not.

What guarantee have we that some European power will not any day close to us other Chinese ports or territories, or annul all American concessions? And what are we going to do about it? The most obvious answer is an understanding with the one great free trade nation of the earth, our natural ally in the Pacific, the most powerful nation that sails the oceans.

But whatever alliances we make or do not make, it is obvious that our diplomatic position in the Far East must be made very strong if we are to share in the partition of the Orient, and if our Philippine possessions are not to become a national calamity and disgrace. We shall need to form a policy very carefully and wisely and stick to it, and we shall need to send to China and Japan and the Philippines some of our best men.

The strength of England and Russia in the East is not the growth of a day. It is the result of a long sustained policy, carried out by men trained for generations. Let us take for example the case of Sir Harry Parkes, who died in Peking while British Minister, in 1884. Parkes went to China in 1841 when he was thirteen years old, entered the British civil service there, learned the Chinese language, became an official interpreter, went slowly up from one post to another, was in the thick of diplomatic and military events, was eighteen years Minister to Japan and a little more than one year Minister to China, when he died of overwork at the age of fifty-six. He served his country forty-three years in the East, and was always a devoted and an able public servant and wished to be nothing else. He was the kind of man that has built up the British Empire, and that is the kind of men we must send to the East if we are to take the place there that so many of our people see opening for us. Such men are not bred in a day; but we can find them among us if we really look for them. When world politics become more important in Washington than Congressional district politics we shall send such men as Parkes to do our work abroad; and this, perhaps, will be the best result of our new foreign policy. We shall again breed statesmen.

The Movement in Receiverships During 1898.

The year 1898 proves to have been remarkable in that it marked the close of the receiverships of nearly one-half the railroads in the hands of the courts at the beginning of that year. The Railroad Gazette has taken the utmost pains to make a list of the railroads in the hands of receivers on Jan. 1, a year ago. It is not believed that the list given in another column is entirely accurate. Only one who has attempted to make a similar table appreciates the difficulties in the way of such work, but it is hoped that, with a few slight minor changes, the facts as they are represented will stand as true for the beginning of the year just closed.

Following the figures there given, it appears that on Jan. 1, 1898, there were 120 steam railroad companies in the hands of receivers. These companies owned 12,798.35 miles of road, or a fraction over 7 per cent. of the entire mileage of the country. They operated 16,198.84 miles, or 9 per cent. of the entire mileage. This is by no means the high-water mark in railroad receivership, since, according to the figures of Henry H. Swain, in his recent publication, "Economic Aspects of Railroad Receivership," the highest point was reached in April, 1894, when there were 210 roads, embracing 36,619 miles, or 20 per cent. of the total mileage of the United States, in the hands of receivers. Even as late as January, 1896, there were some 31,000 miles, or 17 per cent. of the aggregate mileage, under receivers. The capital stock of the 120 companies included at the beginning of last year, aggregated \$375,488,520, and the funded debt, \$442,798,157, making a total of bonds and stock of receivership roads of \$818,286,677, or about one-thirteenth of the entire railroad stock and bonds of the United States.

But the year 1898 has made a marked change in these figures. It is a little difficult at this date to state with certainty the exact number of roads that

JAN. 6, 1899.

THE RAILROAD GAZETTE.

RAILROADS IN THE HANDS OF RECEIVERS JAN. 1, 1898.

Name of Road.	Receivership Begun.	Miles Owned.	Miles Operated.	Capital Stock.	Funded Debt.
Allegheny & Kinzua R. R.	Sept. 30, 1892.	43.	43.	\$500,000	\$285,000
Baltimore & Ohio R. R.	March 1, 1896.	531.9	2,023.88	35,000,000	86,574,500
Sandusky, Mansfield & Newark R. R.	Nov. 30, 1897.	116.25	.....	1,080,600	2,300,000
Pittsburgh & Western Ry.	March 2, 1896.	206.06	339.27	18,500,000	14,111,375
Sharpsville R. R.	Jan. 21, 1897.	17.75	17.75	350,000	.....
Bellair, Zanesville & Cincinnati Ry.	July 1, 1895.	110.75	111.75	1,290,150	1,354,000
Blue Ridge R. R.	Dec. 6, 1894.	34.02	34.02	400,000	168,000
Blue Ridge & Atlantic R. R.	March 14, 1892.	20.9	20.9	13,283,600	12,968,000
Brooklyn Elevated R. R.	March 25, 1897.	17.91	20.25	310,400	394,000
California & Nevada R. R.	April 30, 1896.	23.	.....	.....	.....
Cape Fear & Yadkin Valley Ry.	March 31, 1894.	331.24	341.74	1,972,900	4,922,700
Centralia & Chester R. R.	June 7, 1897.	96.6	99.5	978,000	948,000
Central Vermont R. R.	March 19, 1896.	182.3	510.5	1,000,000	3,000,000
Central Washington R. R.	Sept. 28, 1895.	105.3	124.7	1,500,000	2,150,000
Chicago & Atchison Bridge Co.	Sept. 11, 1894.	0.35	0.35	1,191,600	924,750
Cincinnati, New Orleans & Texas Pacific Ry.	March 18, 1893.	203.2	209.42	12,799,459	4,573,000
Cleveland, Canton & Southern R. R.	Sept. 15, 1893.	323.	349.	14,166,300	16,085,000
Columbus, Hocking Valley & Toledo Ry.	Feb. 25, 1897.	226.21	273.03	7,389,459	10,012,968
Columbus, Sandusky & Hocking R. R.	June 1, 1897.	18.4	18.4	700,700	200,000
Crystal River Ry.	Oct. 9, 1896.	26.72	26.72	10,000	250,000
Cumberland & Ohio R. R., Northern Division.	Jan. 25, 1896.	13.5	13.5	100,000	72,000
Cuyler & Woodburn R. R.	Nov. 22, 1895.	12.28	15.28	50,000	150,000
Dansville & Mt. Morris R. R.	June 8, 1895.	8.	b.8.	50,300	.....
Danville, Mocksville & Southwestern R. R.	July 13, 1896.	24.1	24.1	1,000,000	627,000
Denver, Lakewood & Golden R. R.	Sept. 28, 1896.	14.	14.	2,000,000	1,180,000
Duluth Transfer Ry.	Jan. 14, 1896.	5.02	5.02	1,120,000	1,277,000
East Shore Terminal Co.	Nov. 19, 1895.	17.5	a. ....	.....	.....
Forest City & Sioux City R. R.	March 4, 1897.	65.	b.65.	260,337	360,000
Gainesville, Jefferson & Southern R. R.	Jan. 5, 1896.	55.6	59.5	300,000	60,000
Galveston, La. Porte & Houston Ry.	May 22, 1893.	4.1	a.	60,000	1,200,000
Houston Belt & Magnolia Park Ry.	Jan. 5, 1897.	9.	31.	540,000	720,000
Greenwood, Anderson & Western Ry.	Feb. 1, 1897.	22.	.....	.....	.....
Carolina Midland Ry.	Jan. 2, 1895.	3.	3.	.....	.....
Gunpowder Valley R. R.	May 20, 1897.	22.	22.	600,000	300,000
Harriman & Northeastern R. R.	Dec. 2, 1892.	10.1	21,000	20,000	.....
Hartwell R. R., R. I.	Aug. 9, 1893.	104.	104.	7,320,000	768,500
Hutchinson & Southern R. R.	Dec. 21, 1895.	2.63	2.63	25,000	12,000
Indian Springs & Floyilla R. R.	April 8, 1893.	200.99	200.99	3,000,000	7,718,000
Jacksonville, Tampa & Key West Ry.	July 1, 1897.	106.77	106.77	3,004,200	2,680,000
Kansas Midland Ry.	Oct. 13, 1893.	3.03	9.45	1,700,000	2,000,000
Kickapoo Valley & Northern Ry.	March 3, 1894.	51.3	51.3	114,000	600,000
Kings County Elevated Ry.	Aug. 31, 1896.	8.33	8.33	4,750,000	10,985,112
Laurel Fork & Land Hill R. R.	Sept. 19, 1896.	3.5	3.5	163,600	.....
Leavenworth, Topeka & Southwestern Ry.	April 20, 1894.	46.57	57.77	1,380,000	1,380,000
Lebanon Springs R. R.	Feb. 27, 1888.	51.18	51.18	1,644,000	1,000,000
Litchfield, Carrollton & Western R. R.	May 23, 1894.	51.5	57.8	600,000	500,000
Little Book Cliff.	Dec. 21, 1895.	11.	11.	200,000	100,000
Little Rock & Memphis R. R.	June 1, 1893.	131.16	131.16	3,250,000	3,229,400
Little Rock, Hot Springs & Texas Ry.	Feb. 24, 1896.	5.	a.	1,400,000	.....
Louisville & St. Louis R. R.	Dec. 11, 1893.	16.4	b.16.	1,000,000	247,000
Louisville, Evansville & St. Louis Consolidated R. R.	Jan. 5, 1894.	358.55	374.01	4,247,900	10,563,350
Mammoth Cave R. R.	Aug. 12, 1895.	8.75	8.75	100,000	100,000
Manhattan, Alma & Burlingame Ry.	Jan. 19, 1895.	56.62	56.62	1,000,000	678,000
Memphis & Charleston R. R.	July 15, 1892.	292.	330.	5,312,725	5,524,000
Minnesota Belt Line Ry. & Transfer Co.	Jan. 1897.	14.	14.	100,000	.....
Mississippi & Little Rock Ry.	Jan. 5, 1897.	27.	14.	100,000	.....
Morristown & Cumberland Gap R. R.	Nov. 10, 1892.	40.	40.	1,000,000	1,000,000
Mosher & McDonald R. R.	Feb. 29, 1894.	18.68	18.68	.....	.....
Nashville, Tellico & Chattanooga Ry.	Sept. 1897.	23.	23.	460,000	180,000
New Albany Belt & Terminal R. R.	April 1, 1894.	2.16	2.16	60,000	300,000
New Orleans & Northwestern Ry.	Oct. 1, 1892.	101.36	101.36	4,500,000	1,540,000
Ogdensburg & Lake Champlain R. R.	March 22, 1897.	118.	118.	3,077,500	4,825,750
Pecos Valley Ry.	May 8, 1895.	265.63	265.63	3,840,000	6,697,000
Pennsylvania Midland R. R.	Oct. 24, 1895.	12.6	12.6	1,900,000	510,000
Pensacola & Mobile R. R. & Mfg. Co.	April 6, 1895.	5.25	5.25	.....	.....
Peoria, Decatur & Evansville Ry.	Jan. 13, 1894.	318.3	330.18	8,973,400	5,730,331
Petersburg & Asylum R. R.	Feb. 7, 1894.	3.37	3.37	20,000	30,000
Philadelphia, Reading & New England R. R.	Aug. 19, 1893.	57.6	181.	6,600,000	10,100,000
Pine Bluff & Eastern R. R.	Sept. 30, 1895.	20.	20.	600,000	180,000
Richmond, Nicholasville, Irvine & Beattyville R. R.	Dec. 3, 1891.	60.76	60.76	2,425,000	2,375,000
St. Clair, Madison & St. Louis Belt R. R.	Jan. 15, 1897.	2.8	2.8	900,000	500,000
St. Louis, Avoyelles & Southwestern Ry.	July 24, 1896.	36.	36.	729,000	360,000
St. Louis, Cape Girardeau & Ft. Smith Ry.	March 3, 1893.	94.	94.	1,150,000	1,150,000
St. Louis, Kansas & Southwestern R. R.	Nov. 28, 1896.	59.35	59.35	1,180,000	894,000
St. Louis, Kansas City & Colorado R. R.	Sept. 12, 1894.	56.94	61.42	1,600,000	1,350,000
Salem R. R.	Jan. 12, 1897.	6.92	6.92	.....	125,000
Saratoga & St. Lawrence R. R.	March 23, 1896.	8.5	b.8.5	50,000	100,000
Shelton Southwestern R. R.	April 4, 1893.	12.	12.	200,000	125,000
Sioux City & Northern R. R.	Dec. 5, 1893.	96.	97.28	1,440,000	1,920,000
Sioux City Terminal Ry. & Warehouse Co.	Oct. 10, 1893.	1.28	1.28	1,000,000	2,000,000
South Atlantic & Ohio R. R.	Jan. 1, 1893.	129.18	129.18	3,600,000	2,340,000
South Jersey R. R.	Aug. 8, 1892.	70.69	70.69	1,116,000	1,851,000
Southwestern Arkansas & Indian Territory R. R.	Aug. 21, 1894.	66.2	90.7	940,000	850,000
Stuttgart & Arkansas River R. R.	March 9, 1896.	33.6	33.6	1,400,000	300,000
Techne R. R. & Sugar Co.	Aug. 20, 1895.	41.	41.	500,000	375,000
Terre Haute & Indianapolis R. R.	Nov. 14, 1894.	123.58	123.58	1,988,150	2,500,000
Texas & New Mexico R. R.	Dec. 7, 1892.	51.68	51.68	750,000	1,000,000
Thompson Run R. R. & Coal Co.	Oct. 20, 1897.	56.	56.	46,500	25,000
Toledo & Ohio Central Extension R. R.	Nov. 10, 1893.	49.5	49.5	2,100,000	2,100,000
Toledo, St. Louis & Kansas City R. R.	May 22, 1893.	450.72	450.72	17,055,000	9,000,000
Trinity, Cameron & Western R. R.	Oct. 13, 1893.	1,822.59	2,852.48	60,868,500	74,914,635
Union Pacific R. R.	Oct. 13, 1893.	19.06	280,000	.....	.....
Carbon Cut-Off Ry.	Aug. 8, 1894.	324.7	324.7	3,000,000	2,308,000
Denver, Leadville & Gunnison Ry.	Oct. 13, 1893.	30.19	480,000	480,000	.....
Echo & Park City Ry.	Oct. 13, 1893.	88.00	1,066,100	1,141,000	.....
Junction City & Ft. Kearney Ry.	Oct. 13, 1893.	65.74	1,577,280	862,000	.....
Kearney & Black Hills Ry.	Oct. 13, 1893.	13.36	66,500	.....	.....
Laramie, North Park & Pacific Ry.	Oct. 13, 1893.	14.83	420,000	.....	.....
Montana Ry.	Oct. 13, 1893.	48.04	2,420,550	5,591,000	5,591,000
Omaha & Republican Valley Ry.	Oct. 13, 1893.	35.47	288,400	540,000	.....
Sailina & Southwestern Ry.	Oct. 13, 1893.	57.04	1,180,500	575,000	.....
Solomon R. R.	Dec. 18, 1893.	915.25	973.9	31,007,000	22,436,000
Union Pacific, Denver & Gulf Ry.	Oct. 13, 1893.	225.35	230,800	4,380,000	.....
Union Pacific R. R., Central Branch.	Oct. 13, 1893.	100.	388.19	1,000,000	2,230,000
Atchison, Colorado & Pacific R. R.	Oct. 13, 1893.	254.79	1,522,400	4,070,000	.....
Atchison, Jewell Co. & Western R. R.	Oct. 13, 1893.	33.4	202,400	542,000	.....
Lawrence, Emporia R. R.	Oct. 13, 1893.	30.64	a.	465,000	465,000
Utah Central R. R.	Nov. 27, 1893.	32.62	32.62	.....	.....
Waco & Northwestern R. R.	Dec. 11, 1892.	54.68	54.68	1,024,000	.....
West Virginia, Pineville & Tennessee R. R.	Jan. 4, 1894.	2.06	2.06	300,000	500,000
Wheeling & Lake Erie Ry.	Jan. 15, 1897.	238.58	242.78	14,500,000	7,724,000
Toledo Belt Ry.	Jan. 15, 1897.	4.2	4.2	300,000	500,000
Wheeling Bridge & Terminal Ry.	Sept. 20, 1893.	9.65	9.65	1,500,000	3,500,000
Wichita & Western Ry.	Jan. 14, 1895.	79.5	79.5	1,035,000	1,747,000
Wisconsin Central Co.	Sept. 26, 1893.	257.54	417.05	3,600,308	14,381,777
Wisconsin Central R. R.	Sept. 26, 1893.	426.07	573.01	11,435,500	10,631,000
Zanesville & Ohio River Ry.	July 20, 1892.	72.04	74.28	2,000,000</	

removal of snow and ice. The matter came to a climax in West Springfield, where the company was cited into court, appealed and has carried the whole matter up to the full bench of the Supreme Court for a decision as to just what the law means. Meanwhile the other companies have amicably adjusted their troubles and are awaiting a decision as to the real meaning of the law. Before this decision comes it is possible the law may be amended.

A peculiar feature of the law passed last year is that it expressly continues in force all the conditions of franchises already granted. Therefore, if a franchise provides that the company shall keep a street in repair or paved the fact that it is now to be charged a compensation tax does not relieve it in the least. The companies gain by the law in one respect, in that whereas in the past all franchises or locations were subject to revocation without appeal, no location can now be revoked without the approval of the railroad commissioners.

The State Treasurer now has something over \$500,000—the corporation tax collected from street railway companies in 1898—awaiting distribution. Under the new law this is to go to the cities and towns on the basis of the number of miles of street railway tracks lying in each. But the law provides that the treasurers of the companies shall submit sworn statements of the length of track in each town or city with their annual returns. Under the law these are made to the tax commissioner in May, and so there is no way in which Commissioner Endicott can officially determine where this \$500,000 belongs until next May. Then the distribution will be made. Under the old law about \$100,000 of this would have remained in the treasury, some stockholders of roads in Lynn, Boston, Worcester, etc., being without the state. The remainder has formerly been distributed to the cities and towns where the stockholders resided. This feature of the law pleases both the municipalities and the railroads.

Cast Steel Locomotive Frames.

The cast steel locomotive frame has now got to the point in its history where we can begin to see the way out and can speak with some confidence as to its future. The American Steel Casting Company made their first cast frame June 30, 1896, and have delivered up to date 195 sets, that is, frames for 195 engines. These have been scattered orders in small numbers distributed among several different railroads. Other steel companies have produced a few, but only a few. The first large single order is that for twenty-five consolidation engines for the Atchison, Topeka & Santa Fe, now in the shops at the Baldwin Locomotive Works. For these the Standard Steel Company furnished a few frames, but much the greater part are from the American, and were made at Thurlow.

These frames are 24 ft. 4½ in. long and finished to 4 in. wide x 3½ in. to 5½ in. deep. Each side weighs rough about 4,500 lbs. The rough weight has gradually been reduced until in the latest frames delivered it is about 4,200 lbs. The amount of metal allowed to finish depends largely on the accuracy of the casting. In the published catalogue of the American Steel Casting Company is the statement that an allowance of ¼ in. should be made, the finish to be increased for large shapes. In the Atchison frames the allowance was at first about ¾ in., but in the last has been reduced to ½ in. This has an important bearing on the final cost of the frame, not only in metal paid for, but in cost of finishing.

The frames cannot be cast so straight that they can go directly to the planer; at least they have not been yet. The great length of the casting as compared with the cross section is such that some drop at one end is unavoidable, and there must be more or less heating and straightening in the forge shop before the frame is put on the planer. This straightening is, however, no more than must be done to a forged frame after it is welded up.

The machining now costs more than that of a forged frame. Possibly it always will, but that is not certain, for with experience the tools and the methods may perhaps be better adapted to the work and the rough casting may be brought closer to the finished size. The material is tougher than wrought iron, and the tools must be run slower and with a lighter feed. Up to now the steel cast frames cost from \$100 to \$150 per engine more than wrought iron, but we are quite prepared to see that cost even less than wrought iron in a year or two. We are informed that on this Atchison order only one frame was lost in the foundry, and that was the first one cast, which, probably, should not really count as lost. It is very likely that the work could now be carried on almost indefinitely without losing another frame. None were rejected in the machine shop.

The finished result is beautiful. The American Steel Casting Company has no trouble in producing a steel cast frame free from blowholes or bubbles. In none of the frames made on this large order has machining developed flaws that caused rejection. In

fact, so far as we could see, in examining a good many pieces of various work, there were no flaws in the machined surfaces.

At Thurlow a great variety of work is doing for the army and navy and for private concerns. We saw there the stern post for a Russian cruiser, now building at Cramp's, weighing 48,000 lbs.; United States navy anchors weighing 13,000 lbs.; parts of gun carriages and racers for army and navy guns; driving wheel centers, crossheads and expansion pads for locomotives, and finally, castings weighing two or three pounds for electrical work. We saw connecting rods for locomotives, and siderods have been made. This only suggests the variety of the work. It is but the beginning of the list.

All this product is made of practically one quality of steel. The carbon is varied a little to suit requirements, but the stock is the same, and the product is essentially all one uniform quality of acid open hearth steel. It is subject to constant inspection and tests by officers of the army and navy, and there are always two or three navy officers on duty at the works, and their requirements are very strict, as everybody knows. The mass of the product must pass these gentlemen, and even if there were any disposition to drop the quality it is cheaper to keep the furnaces running on one uniform grade, so that any melt is available for any purpose. By way of indicating the quality of the Thurlow steel we may take a few analyses and tests at random. The engraving shows a test piece from the steel for a United States navy anchor, cast at Thurlow and accepted by the inspecting officers of the navy. This rod is ¾ in. in diameter, and the writer of these lines saw it bent cold to the shape shown in the engraving, and without a crack or

flaw. The official record of this melt shows the chemical analysis as follows:

Carbon .....	.24
Silicon .....	.22
Manganese .....	.55
Phosphorus .....	.026
Sulphur .....	.031

The physical tests of three specimens showed:

Elastic Limit.	Ultimate Strength.	Elongation Per Cent.	Reduction of Area in 8 in.	Per Cent.
34,000	68,000	18.75	33.65	
33,200	68,000	22.50	33.65	
33,600	68,000	23.25	35.87	

The following table gives some of the physical properties of eleven of these American cast steel frames as determined at the Baldwin Works. The specimens pulled were 2 in. between shoulders:

Tensile strength, lbs. per sq. in.	Per cent. of elongation.
72,440	25
64,800	25
71,900	27
75,460	23
69,700	32
69,560	27.5
74,920	25
68,350	30
80,000	25
62,440	20
80,410	25

The following are the results of chemical analyses of 16 of the sets of the American Steel Casting Company's frames, as determined at the Baldwin Works:

C.	Mn.	Ph.	Sul.	Si.
.24	.70	.031	.036	.245
.28	.78	.034	.033	.282
.28	.70	.040	.041	.20
.25	.70	.030	.047	.228
.25	.63	.035	.046	.27
.25	.71	.030	.043	.261
.24	.70	.024	.048	.268
.26	.68	.043	.046	.259
.24	.62	.029	.042	.266
.24	.64	.040	.039	.203
.24	.60	.040	.040	.210
.23	.70	.038	.048	.221
.24	.60	.042	.042	.238
.23	.62	.040	.046	.280
.24	.70	.037	.043	.275
.22	.60	.039	.043	.256

The following analyses of three of these frames were made at Thurlow:

C.	Mn.	Ph.	Sul.	Si.
.24	.57	.039	.041	.229
.23	.66	.045	.042	.256
.23	.68	.041	.048	.256

The following physical determinations were made by Capt. Lyle, Ord. Dept., U. S. A., of accepted material for 10-in. and 12-in. gun carriages; tests on 2-in. sections:

El. limit, lbs. per sq. in.	Tens. strength, lbs. per sq. in.	Elongation, per cent.	Red. of area, per cent.
36,500	70,000	27.0	41.0
31,500	67,500	25.2	41.6
32,000	69,000	27.5	34.1
32,500	69,500	25.5	39.1
33,000	67,500	25.5	38.2
36,000	69,500	23.5	43.1

These are not show tests of selected specimens, but the regular daily tests of material turned out in the ordinary course of business. They are taken at random from the files at the works, where anyone can examine them by the ream. Probably none of the tests given above were of annealed pieces; at least it is not the general practice at Thurlow to anneal castings.

Such are the steel cast frames that can be furnished day by day, week in and week out—clean, sound, tough and uniform. Probably the uniformity of this product is quite as reliable as that of any other form of steel or iron that can be turned out at a price that will permit its use in locomotive frames. Hadfield said: "There is no rapid or royal road to the production of sound steel castings; this is only attained by long experience, combined with specialized knowledge." Such experience and knowledge are now in the market, turning out great quantities of sound steel castings, and these are being tested daily in service of great severity. That being so, we can take it as settled that steel cast locomotive frames can be produced as a staple commodity, like wrought iron frames, if the demand for such a commodity is created. Is it probable that such a demand will soon be created? Probably so.

We have seen that the cast frame so far costs somewhat more than the wrought iron frame; but it is a question if that difference will not disappear before the important order now in hand is finished. It is a fair assumption that the younger art will advance much faster than the older one, and that the economies developed in producing the rough frames and in finishing them will henceforth be greater with the cast frames than with the forged frames. Moving closer to the finished size, and improvements in planing, slotting and drilling are some of the possibilities. And further, the use of the cast frame looks like a step in that evolution which is steadily changing the ratio between the amount of machine work and hand work in the product of every industry.

If the cast frame can be furnished at the same cost as the wrought frame, not at a less cost, but at the same cost, it will probably win. With its higher elastic limit and greater tensile strength a stiffer and stronger frame can be made with the same weight. Or, with the same strength and stiffness a lighter frame can be used and the weight saved can be put in the boiler, where it will do useful work.

The cast frame will probably be safer from breaking, even at the same or less weight, for defective welds will not exist, and exact uniformity of strength throughout the structure can be relied upon in the present state of the art of steel casting.

These propositions are not laid down as infallible dogma, or as self evident, but they seem sound and reasonable, and if anybody can show that they are unsound the field is open to him.

The mammoth palatial new passenger station at Summer street, Boston, is now open for business, and a description of it appears on another page of this paper. The loop tracks beneath the main floor of the train shed are to remain idle for an indefinite time, for the reason that the New Haven road has not yet reached a decision as to what kind of smokeless motors will be used for the suburban trains which the underground station has been provided for. Concerning the economy of the loop tracks, Engineer Francis, of the Terminal Company, says:

"At first glance it would hardly seem possible that two loop tracks, though they require equal space, could take the place of the 28 stub tracks on the floor above, but the switching problem is practically disposed of and the platforms are long enough so that several trains of three or four cars each may stand next to them, and, by alternate use of the two tracks, it will be possible to send out a train each minute. This means upward of 2,000 trains in and out each day of 18 hours on these two tracks alone, which is five times as many as are at present run in the suburban service; in fact, the traffic is handled on street railroad methods in this part of the station, which seems to be what has been required all along. The number of suburban trains daily on Boston road is now about two-thirds of the total trains, and it is estimated with the adoption of electricity and a more frequent service the suburban trains will outnumber the others six to one."

"The loop tracks are two in number and connect with the main tracks at points about one-half mile from the station, the connecting curves and grade being suited to the light rolling stock required for suburban business. The radius and head room of the loop tracks is sufficient for the use of just such cars as are now run on suburban trains. The central platform lies immediately below the midway on the main floor and is connected with it and with the main waiting room by stairs. It is designed to be the loading platform and is the right platform for all trains. The unloading is designed to be done on the outside platforms. The total platform area on this floor is large enough to allow the assembling of about 25,000 people at one time. It is to be raised about 4 feet above the tracks, so that the height of the stairway is to be 13 feet, while there is an 8-foot rise in passing to Summer street by the inclined way, which will have a gradient of not more than 6 feet in 100. So long as only one of the two loop tracks is needed, therefore, all climbing of stairs will be avoided. The radius of the outer track is 262 feet and the inner 242 feet. All of the long distance traffic and, for the present, all of the local traffic, will be handled on the stub tracks on the main floor of the station."

NEW PUBLICATIONS.

Twenty-ninth Annual Report of the State Board of Health of Massachusetts. Boston: Wright & Potter Printing Co., 1898.

The valuable annual report of the Massachusetts State Board of Health scarcely calls for comment; those who are well-informed in sanitary and municipal engineering must know of the work done year

by year in Massachusetts. An illustration of the efficiency of this work is found in a table of deaths and death rates from typhoid fever for five-year periods, from 1871 to 1895. In the first of these periods, the rate for the state of Massachusetts was 8.2 per ten thousand inhabitants; in the last of the periods it had fallen to 3.2—certainly a result well worth striving for. Another table shows deaths and rates, year by year, from 1877 to 1896, from various diseases. The rate for diphtheria and croup fell from 18.7 to 6.6; from typhoid, from 4.8 to 2.8; from consumption, from 32 to 21.7. But in those diseases over which sanitary experts can have little or no control, and which are more affected by the intensity of life, the rate has increased; as, for instance, from kidney diseases, 3.1 per ten thousand died in 1877, and in 1896, 7.6. From heart disease the death rate was 8 in the first of those years, 14.3 in the last; and from brain diseases the death rate was respectively 14.3 and 21.2. All petitions to the Legislature for authority to introduce systems of water supply and sewerage must be accompanied with the advice and recommendation of the Board. During the year 1897, 59 applications for advice were made, and the report contains detailed information of the results of examination of numerous water supplies. There are valuable tables of rainfall and other water supply statistics, accounts of experiments on purification of sewage and water and of the study of methods of sewage disposal.

The Designing of Draw-Spans.—In two Parts: I. Plate-Girder Draws. II. Riveted-Truss and Pin-Connected Long-Span Draws. By Charles H. Wright, M. Am. Soc. C. E. New York: John Wiley & Sons, 1898. Octavo x + 372 pages, and folding plates. Price, \$3.50.

Sewerage.—The Designing, Construction and Maintenance of Sewerage Systems. By A. Prescott Folwell, M. Am. Soc. C. E. New York: John Wiley & Sons, 1898. Octavo x + 372 pages. Price, \$3.00.

These books deal with very unlike things. A drawbridge is a movable metallic structure exhibited in all its beauty, or more often in its ugliness, above the surface of the earth. A sewerage system is composed of non-metallic conduits buried in the ground, whose presence is indicated only by manhole covers or by the openings of street inlets. Such dissimilar constructions cannot be compared either with respect to principles of design or with regard to maintenance. Nevertheless the books can be compared, for book-making is an art in itself.

One may learn from the membership of the American Society of Civil Engineers that Mr. Wright is with the Edge Moor Bridge Works and that Mr. Folwell is a civil and sanitary engineer. Both authors are hence actively at work in their specialties, and their writings should have a different flavor from the productions of professors. Refined theoretic disquisitions are not expected, but empiric and rule-of-thumb methods, numerical examples, and descriptions of completed works are to be anticipated. It is, however, to be demanded that all technical books, by whomsoever written, shall be clear and concise, be logically arranged and sound in doctrine, and be practically free from errors.

Mr. Wright's book contains much matter relating to the mechanical side of drawbridge construction that cannot be easily found elsewhere. Turntables with their pivots or rollers are, in particular, described with fullness, and methods for their design presented. The formulas are stated without demonstration, and no attempt is made to preserve uniformity of notation. Thus, on pages 23 and 25 the letters *l* and *L* are used as happens to please the fancy, and the same is done on pages 108 and 109. On one page the strength of a roller varies with its diameter, and on another as the square root of its diameter. The formula for investigating a shaft under combined bending and twisting is incorrect and absurd. The lettering on the cuts is of all styles, and that on some of the folding plates is almost illegible. Names of distinguished engineers are misspelled; for instance, Clarke is designated as Clark, and Morison as Morrison. The book is padded to excess with tables taken from catalogues of manufacturers, extracts from technical periodicals, and formulas from standard text-books, many of which are used without acknowledgment. In short, Mr. Wright's volume plainly shows that an engineer may be able to construct a very good drawbridge and yet be ignorant of the first principles of book-making. It is a misfortune that this has been the case in the present instance, for a good book on drawbridge machinery has long been needed.

Mr. Folwell treats both the combined and separate systems, this being the first American book on sewer construction to cover the two fields. The title expresses clearly his aim, and hence house drainage and sewage disposal receive but little notice. The book has evidently been prepared with care, for it is systematically arranged, free from padding, and we have discovered no errors. A tabulation of the results of Kutter's formula is given, so that but few hydraulic computations need to be made; this may be a convenience, but it ought not to dispense with that sound judgment which can only be obtained by a thorough grounding in the principles of hydraulics. Much valuable matter regarding the details of con-

struction and maintenance is presented, which will render the book useful both to students and city engineers. In short, the volume indicates that the author has not only had much experience in sewer construction, but also that he knows how to arrange, systematize, and present his knowledge in such shape as to be assimilated by his readers with pleasure and profit.

The report of the seventeenth annual meeting of the American Street Railway Association has been printed. As in former reports, the volume contains a full account of the last annual meeting, with a list of members and the officers. The volume has for a frontispiece a steel engraving of the past President, Mr. A. E. Lang. An excellent diagram accompanies Mr. Conant's paper, giving the report of the committee on the cost of electric power for street railroads.

Proceedings of the Twenty-ninth Annual Convention of the Master Car and Locomotive Painters' Association. September, 1898. New York: Railroad Car Journal.

The proceedings of this Association are published in a substantial cloth-bound volume, and may be had from the publisher. The price of the volume is not mentioned, so far as we discover.

Mr. Charles Wallace Hunt's presidential address before the American Society of Mechanical Engineers was published by abstract in a recent issue of the Railroad Gazette. It has been printed in full in pamphlet form, and can doubtless be obtained from Mr. Hunt.

TRADE CATALOGUES.

Machine Tools.—The Niles Tool Works Company, of Hamilton, O., issues a new catalogue of iron and steel working machinery made at Hamilton, O., and handled at the warerooms and offices of the company in the leading cities of the United States and Europe. The purpose has been to make the catalogue complete and comprehensive, illustrating machinery of every type required in the equipment of shops and factories for working up iron and steel. The plant at Hamilton covers 15 acres of floor space, under roof. There are 30 overhead traveling cranes, of from five to 30 tons' capacity each, and all the equipment for rapid and economical output. This catalogue is an octavo volume of 572 pages, bound in cloth, and is made up of illustrations and descriptions of an immense variety of machinery and machine tools. There are but few concerns in the world that could turn out such a catalogue.

The Q & C Company, Chicago and New York, issues a special catalogue of pneumatic tools. The company has purchased the entire business and good will of the Ridgeley & Johnson Tool Company, and has added a new tool department. The special claims made for their line of pneumatic tools is simplicity. They have no valves, and but few parts. The company asks to be allowed to submit estimates on completing pneumatic plants, and can quote on compressors, receivers, hoists, drills, reamers, small portable engines, etc. The company has made an arrangement with Fairbanks, Morse & Co. under which it is prepared to offer the engines and compressors made by that firm.

The Damascus Bronze Co., Pittsburgh, sends us two pamphlets, one descriptive of the merits of Damascus bronze; the other of various special bearing metals, such as phosphor bronze, nickel bronze, phosphorized copper, phosphorized tin and different grades of babbitt metal. As to the wearing qualities of Damascus bronze, extracts are presented from a paper by Dr. Charles B. Dudley, read in 1890 before the British Iron and Steel Institute, showing that this metal wears 7½ per cent. longer than phosphor bronze in the same service.

The Monarch Brake Beam Co., Ltd., Detroit, Mich., has issued a pamphlet illustrating its hollow and rolled steel brake beams by half-tone and line engravings. All the detail parts of these beams are plainly marked with the shop numbers, to be used in ordering. The statement is made that of many thousand improved Monarch brake beams now in use there has not been a single failure. It is also stated that during the first year the solid beam has been on the market, 25,000 have been sold and no failures reported.

The Industrial Works, of Bay City, Mich., send us "Circular M," dated November, 1898, being an illustrated circular describing wrecking cranes in capacities from 10 to 40 tons. There are a number of half tone engravings from photographs, and sufficient description to give one a very definite notion of the construction and performance of these cranes.

Steam Shovels, Dredges, etc.—The Toledo Foundry & Machine Company issues a handsome new catalogue of railroad excavators and wreckers, steam shovels, dredges, turn-tables, hoisting gear, pile-drivers, and pumps and marine and stationary engines. The pamphlet has 94 pages, handsomely illustrated.

TECHNICAL.

Manufacturing and Business.

The Falls Hollow Staybolt Co., Cuyahoga Falls, O., reports two large orders taken Dec. 31 for Safety Hollow Staybolt Iron, one being from a shipbuilding company in Philadelphia, the other from the Calumet & Hecla Mining Co. The staybolt company expects a large business for 1899.

During January the Q & C Co. will move its New York offices to the corner of Liberty and Church streets, where it will have offices and salesroom combined. A considerable stock of machinery and tools of the company's make will be carried.

The Anchor Electric Company, of Boston, Mass., has opened an office in the Havemeyer Building, New York City, under the management of Henry G. Issertel, where a complete stock of the company's specialties will be carried.

Messrs. Hackett, Carhart & Co., of New York City, make a specialty of uniforms and invite superintendents and purchasing agents to send for samples and estimates. The company now makes uniforms for the New York, New Haven & Hartford, the Staten Island Rapid Transit, the Manhattan Elevated, Brooklyn Elevated, New York & Brooklyn Bridge, Adams Express and other companies. They claim to have some new and special ideas and methods.

We are informed by the Wickes Refrigerator Car Co. of Buffalo, N. Y., that the Union Pacific is remodeling a number of its refrigerator cars, substituting the Wickes system of refrigeration for systems now in use.

The Fischer Equipment Co. of Chicago has closed a contract to build, for use in Europe, a minimum number of 100 motorcycles a year.

The Mark Steel & Iron Co. has been incorporated with \$100,000 capital, to make rail joints and other track equipment. The works will be at Plano, Ill., and the main offices will be in the Monadnock Block, Chicago.

The Link Belt Machinery Co., of Chicago, reports that it was very busy during 1898, necessitating running its plant night and day for seven months, and full time for the balance. Contracts were executed for power transmission machinery, link-belt elevators and conveyors, dynamos, engines, switchboards, mining machines and other machinery.

Mr. Frederick W. Kelly has been appointed General Manager and Treasurer of the Consolidated Car-Heating Co. of Albany, N. Y. Mr. Kelly succeeds Mr. Charles Sheldon.

F. M. French, 175 No. Broadway, Los Angeles, Cal., is offering for sale about 10,000 ft. of one-inch cable, which was used about six weeks on a cable road.

The Pratt & Whitney Co., of Hartford, Conn., has opened an office and salesroom in Buffalo, N. Y., under the management of J. L. Osgood, until recently managing partner in the firm of R. Hoffeld & Co., of that city. Mr. Osgood is a member of the Am. Soc. of Mechanical Engineers and has long been identified with the machinery trade of Buffalo and vicinity. It is the intention of the Pratt & Whitney Co. to fit out its Buffalo store with a complete line of machinery for all classes of work.

Iron and Steel.

The Cambria Steel Co., having leased the Cambria Iron Co.'s works, has consolidated its New York offices, at 71 Broadway. H. L. Waterman has been appointed General Sales Agent for New York City and vicinity, and he will give special attention to the sale of structural steel, steel blooms, billets and slabs. W. A. Washburne will give attention to negotiations for steel rails and railway track fastenings. L. R. Pomeroy will give attention to steel axles and other forging specialties. Thos. F. Russell, 102 Chambers street, New York, will sell, as heretofore, the special products of the Gautier Department.

Press dispatches state that E. J. Buffington, Treasurer of the American Steel & Wire Co., will succeed John W. Gates as President of the Illinois Steel Co.

Newspapers state that official announcement has been made of the absorption of the Washburn & Moen Manufacturing Co. by the American Steel & Wire Co.

According to press dispatches, the Pennsylvania has awarded contracts for 105,000 tons of rails for 1899 delivery as follows: Cambria Steel Co., 30,000 tons; Pennsylvania Steel Co., 30,000 tons; Carnegie Steel Co., 30,000 tons; Federal Steel Co., 10,000 tons; Lackawanna Iron & Steel Co., 5,000 tons.

New Stations and Shops.

The St. Paul Union Depot Co. has taken out a permit to build new train sheds, on the north side of the union depot, 600 ft. long and 25 ft. wide.

The Canada Atlantic is tearing down a number of the storehouses in the yards at Ottawa, and it is stated that a large car shop will be built.

Knitted Elastic Padding.

The Knitted Mattress Co. of Canton Junction, Mass., has for the past several years made knitted elastic padding for stuffing seats of passenger coaches and

cab and caboose cushions. The padding is made of cotton, and is used in place of curled hair. In a circular recently sent out by the company are testimonials from the Delaware, Lackawanna & Western, International & Great Northern, Western Maryland and other roads, who have used the padding as a substitute for curled hair, and it is clearly shown that an upholsterer can work five or six seat backs with the padding in the same time he can one of hair, saving considerable in the cost of labor. The claims made for the padding are: That it cannot get lumpy, nor can any part become misplaced; will not harden by matting; is not as expensive as curled horse hair; requires less labor to apply, and protects the plush better than any other material used.

Bent Rails—The Old Story.

A new freight locomotive having 56-in. driving wheels was recently hauled over the Wabash too fast and with the side rods disconnected, with the result that some stretches of track were badly damaged. Between Huntington and Wabash, Ind., it is thought a speed of from 40 to 45 miles an hour was reached, and 772 63-lb. rails were so badly bent as to require removal; 10 of these were broken. The rule on the Wabash is that such engines shall not be hauled at speeds exceeding 20 miles an hour.

The Consolidation of Signal Companies.

Dec. 23 (page 919) we gave some particulars of the consolidation of the Union Switch & Signal Company and the National Switch & Signal Company. We now have further information.

All of the apparatus heretofore made by the Johnson Railroad Signal Company, the National Switch & Signal Company and the Union Switch & Signal Company, will be supplied by the Union Switch & Signal Company, under which title all business will be conducted. The works at Swissvale and Easton will be improved and maintained so as to secure a minimum cost of production, with maximum facilities for handling the business.

A Department of Sales and Installation has been created with Mr. Charles Hansel, C. E. (formerly Vice-President and General Manager of the National Switch & Signal Company), as Manager, with offices at 43 Cedar street, New York City, and he announces the following appointments, effective Jan. 1, 1899: Henry M. Sperry (formerly Signal Engineer and Western Agent of the National Switch & Signal Company), as Signal Engineer and Representative, with office at 43 Cedar street, New York City; V. K. Spicer (formerly Signal Engineer and Agent, Western District, of the Union Switch & Signal Company), as Signal Engineer and Representative, with office at 1535 Monadnock Building, Chicago. This department will have full charge of all quotations for contracts and material, and the installation of all work. All correspondence should be directed to it.

An Alleged Gas Explosion.

On the morning of Dec. 28 a limited train on the Atchison was wrecked not far from Trinidad, Col. The wreck caught fire and four cars were burned, being an observation car, two sleepers and a composite car. The newspaper reports were that the fire was started from an explosion of gas in the composite car. An inspector of the Safety Car Heating & Lighting Co., who is investigating the matter, wires that the tanks in this wreck are intact, and that there was absolutely no explosion of them. Another person tells us that the Atchison rigs up a contrivance to run a gas pipe up through the Baker heater room to a four-flame burner under a small tank filled with water, to supply hot water to the barber, when the Baker heater is not fired up. It is possible that through some damage to this rigging gas was ignited. This matter will be further investigated. Meantime, it is quite obvious that the Pintsch gas lighting system as such had nothing to do with the fire, which has been true of every similar occurrence that we have investigated, so far as we can remember, and we have looked into a good many of them in the last dozen years.

The Nicaragua Canal.

The Walker Commission has made a preliminary report on the Nicaragua Canal. The Commission favors the Lull route, and estimates the cost of the Maritime Canal Company's route at \$124,000,000 and of the Lull route at \$123,000,000. The Lull route is easy of construction, presents no problems not well within good engineering precedents, and will be safer and more reliable when completed.

Colonel Haines, Corps of Engineers, U. S. A., concurs in everything except that the estimates should be increased by about 20 per cent.

THE SCRAP HEAP.

Notes.

The Chicago, Milwaukee & St. Paul has decided to use cardboard for all baggage checks given to passengers.

The State Railroad Commissioners of Texas have ordered the railroads to regularly file their timetables with the Commission.

Elevator X of the Chicago, Milwaukee & St. Paul, at Minneapolis, was destroyed by fire Dec. 29. Loss, including 200,000 bushels of wheat, \$200,000.

At Omaha, Neb., a ticket scalper, George Davis, has been sentenced to three years' imprisonment for selling forged tickets on the streets in Omaha last summer.

The Southern Pacific has abolished the use of gates on passenger trains in Texas. This action seems to have been necessitated by the similar action of the Missouri, Kansas & Texas.

Montreal papers report that the Canadian Pacific intends to run a fast train across the continent regularly next summer. The shops of the company have just turned out two new dining cars.

The Commissioner of the Central Passenger Association has issued a circular setting forth that a man claiming to be F. B. Sanford, general freight and passenger agent of the Maricopa & Phoenix and Salt River Valley roads, has been obtaining free transportation and selling it to ticket scalpers.

Torrey E. Wardner, the editor of the Boston Traveler, who was imprisoned at Dedham, Mass., for contempt of court, was let out of jail on the night of Dec. 31. He averred that his health was being impaired by the close confinement, and he made a written statement regretting that he had violated the law.

The Great Northern has built 50 large freight cars to be used exclusively for merchandise from St. Paul and Minneapolis to the transfer station a few miles out, and for return loads from the transfer to the cities. These cars are 57 ft. 5 in. long inside; 8 ft. 5 in. wide, and 8 ft. 2 in. high. They will carry 70,000 lbs. each. The cars have two double doors on each side.

Kansas newspapers state that the conductors and enginemen of the Atchison, Topeka & Santa Fe are annoyed at the strict regulations of the company's watch inspector and are going to ask the Legislature of the state to pass a law regulating watch inspection. One of these days we shall probably hear of a bill in the Legislature to keep enginemen from inspecting the running gear of locomotives too often, lest too high a standard of safety be maintained.

The Attorney General of Texas has filed in the Travis County District Court, at Austin, 12 penalty suits against the Texas & New Orleans Railroad, and eight against the Galveston, Harrisburg & San Antonio, for refusal to permit the Railroad Commission's agent, E. M. Underhill, to examine their books on Sept. 26, 28 and 29. The minimum penalty in each case is \$125 and the maximum \$500, and the statute provides that a separate offense can be charged for each day since the first demand was made.

Cincinnati papers report that Mr. M. E. Ingalls, President of the Cleveland, Cincinnati, Chicago & St. Louis and the Chesapeake & Ohio, gave a dinner party to railroad presidents at his home in that city on Thursday night of last week, and that, after the party, "it transpired that a gentlemen's agreement had been made" to maintain freight rates. The guests at the dinner were: W. M. Greene (B. & O. S. W.), Samuel Hunt (T., St. L. & K. C.), James McCrea (Penna. Lines), E. R. Bacon (B. & O. S. W.), V. T. Malott (Vandalia), W. H. McDoel (C. I. & L.), M. D. Woodford (C. H. & D.), W. H. Canniff (N. Y., C. & St. L.), Charles M. Hays (Grand Trunk), George T. Jarvis (L. E. & St. L.), J. T. Harahan (Ill. Cent.), M. J. Carpenter (C. & E. I.), and Edward Colston, of Cincinnati. Another press dispatch from Cincinnati says that freight shippers in that city have received notices from the railroads that on and after Jan. 1 tariff rates would be rigidly adhered to.

The Kansas Legislature.

The special three weeks' session of the Kansas Legislature has begun and a railroad bill has already been passed and signed by the Governor. The act converts the State Railroad Commission into a court, with full power to hear and determine all controversies concerning rates, and to enforce its orders in the same manner as courts of law and equity. The Governor is given authority to appoint the three commissioners composing the court, and the appointments are not to be confirmed by the Senate. The Governor is also to appoint a solicitor, who is to represent the interests of complainants in all proceedings before the board. There are various clauses which give evidence that all of the most accomplished Past Grand Masters of Populism had a hand in drafting the bill; but the crowning jewel of consistency is a provision that "when a complainant suspects that the State Solicitor is working in the interest of a railroad company he may ask the court to appoint a special solicitor for his case, whose compensation shall be taken from the salary of the regular solicitor." The new law is to take effect March 15, and the first appointments will be made by Gov. Stanley, the incoming Republican Executive. This provision was made by the Populists in order to escape the charge that they were trying to legislate themselves into office. In addition to its other duties the new court is empowered to settle controversies growing out of strikes on railroads in Kansas.

Railroad lawyers in Chicago and St. Louis question the constitutionality of the special session of the Legislature. Under the state constitution the Legislature may meet only once in two years, and after it has adjourned it cannot be reconvened, and all its functions cease. Section 5 of article 1 of the constitution says that the Governor may, on extraordinary occasions, convene the Legislature by proclamation. By no stretch of imagination, say the lawyers,

can the present time be termed an extraordinary occasion, seeing that a regular session of the Legislature will be held within three weeks from the date set by the Governor for the beginning of the extra session.

A Fat Dividend for Conductors.

Press dispatches from Newport News, Va., report that the sum of \$16,000 has been divided among the conductors and motormen of the Newport News, Hampton & Old Point (Electric) Railway, some of the men receiving as much as \$700 each. It appears that the company named has just been consolidated with another line, and that in the settlement of the financial affairs of the expiring company there was a fund, made up of excess fares which had been collected during a series of years, that had to be disposed of. This fund amounted to about \$24,000, and of this sum \$16,000 became the property of three persons, Mr. J. S. Darling, one of the principal stockholders, and two other Darlings; and they divided their portion among the conductors and motormen of the road, the sum granted to each man being proportioned to the length of time that he had been employed on the road. "Excess fares," whatever the term may mean in this connection, would seem to be a comfortable account to open on every road.

The Carbondale & Honesdale Gravity Railroad.

The Delaware & Hudson Canal Company announces that the Gravity Railroad between Carbondale and Honesdale is not to be wholly abandoned, after all. Passenger trains and local freight trains are running regularly and will do so until further notice. Between Honesdale and Waymart, ten miles, the stations on the "light track," the track used for empty coal cars moving westward, and which in some places lies a considerable distance away from the "loaded track," are abandoned and trains in both directions will be moved between those points over the loaded track by locomotives. The grade of this track is uniformly 45 ft. per mile, ascending, from Honesdale to Waymart. The local newspapers say that the company intends to widen the gage of the Gravity road to 4 ft. 8½ in., and to put the whole line in condition for the use of locomotives and standard cars. The officers of the road, however, have not confirmed this report. The Gravity road was described in the Railroad Gazette of Nov. 18, page 826. Its track is 4 ft. 3 in. gage, and on the steep grades, some of which are 8 per cent. and steeper, cars are moved by cables actuated by stationary engines.

The Atlantic Transportation Co.

The Atlantic Transportation Co., the concern which a few months ago bought 40 vessels on the Great Lakes, intending to transfer them to the Atlantic Ocean, is in financial straits, and E. B. Meany, President of the company, and M. E. Ingalls, Jr., have been appointed receivers. The liabilities of the company are about \$25,000, and the assets, consisting chiefly of 24 purchased vessels, valued at \$900,000, are estimated to be worth at forced sale \$613,500. One of the chief creditors is the Chesapeake & Ohio Railway Co., to which the Atlantic Company owes \$141,309, partly secured. The company was incorporated Nov. 4, 1897, with a capital stock of \$3,000,000. Its business has been chiefly carrying coal from Newport News to North Atlantic ports. Ten of the vessels bought on the Lakes were detained in the St. Lawrence River by ice; and three others were lost at sea.

The Grand Central Station.

It is now announced that the reconstruction of the first floor of the Grand Central Station, New York City, will be carried out during the present year. In the plans for the enlargement of the station, which were published Feb. 19, 1897, provision was made for a single large waiting room at the south end of the building, to take the place of the three separate waiting rooms now used for the three railroad divisions using the station; but in the carrying out of the plans, the work on the upper floors was untouched, while that on the first floor was left untouched.

The reconstruction of the first floor involves the making of a large baggage room on the west side, with underground passages from the south end of this room to the train platforms at the north end of the building.

Multiplex Printing Telegraph.

Press dispatches from Baltimore state that Prof. Henry T. Rowland, of Johns Hopkins University, will shortly make a test of his multiplex printing telegraph between Baltimore and Pittsburgh. Prof. Rowland has for several months been perfecting his invention, and laboratory experiments made last summer were highly successful. He proposes to send four messages in each direction simultaneously. The sender works on keyboard like that of a typewriter and the receiving instrument prints in Roman letters.

Harbor Works.

Dispatches from Racine, Wis., report that plans and estimates for the improvement of the harbor at that point have been prepared. It is proposed to dredge the harbor, build a breakwater and widen the river, at a cost to the city of \$10,000 and to the Government of about \$150,000, for which the River and Harbor Committee will be asked to provide in its appropriation bill this winter.

New Sleepers on the Lehigh Valley.

The Lehigh Valley has recently placed in service between New York and Buffalo four new sleeping cars, the Spartan, Trojan, Grecian and Corinthian, which are the latest product of the Pullman Works. These cars each have a commodious ladies' boudoir, provided with a dresser. The cars are 78 feet long over platforms and have wide vestibules, Plintsch gas and safety steam heat. They are finished in varnished wood and are plainly yet handsomely decorated with inlaid marquetry work. The upholstery on the seats is a moquette of Persian design, with green border and center pattern of bright colors. The ornamentation of the ceiling harmonizes with the upholstery and other interior finishings, giving the car an Arabesque effect.

Freight Rates on Gold Dust.

We published a few weeks ago an extract from the lately published freight tariff of the White Pass & Yukon Railroad, of Alaska, which provides for the modest charge of \$2.23 per ton per mile, a rate which to an Eastern reader seems somewhat extravagant. But for a really exorbitant transportation charge we must take into consideration the rates for the transportation of small packages on fast trains, and in this

respect the White Pass & Yukon Express Company, which has just begun business, puts the freight train tariff of that road far in the shade. On merchandise by express the rate from Skagway to Atlin Junction is 7 cents a pound; to Lake Bennett, 9 cents. This, we presume, is what may be called first class; wild animals boxed are 11. Gold dust is three times first class, and is figured in cents per ounce. Evidently the express company intends to "strike" the gold diggers hard enough to secure for itself a reasonable share of their quickly acquired wealth. If a shipper is fortunate enough to have 10 pounds of dust he can get it carried at the reduced rate of 25 cents an ounce.

Technical Schools.

Cornell University.—The Sibley Journal of Engineering states that through Prof. H. Wade Hibbard of the School of Railway Engineering, arrangements have been made with various railroads and locomotive works, whereby students who expect to take that course can get employment during the summer vacations and so gain some practical knowledge of railroad work.

R. P. L.—N. P. Lewis, M. Am. Soc. C. E., Engineer of Streets of the Borough of Brooklyn, and a graduate of the class of 1897 of the Rensselaer Polytechnic Institute, delivered a lecture before the students of that institution, Wednesday evening, Dec. 21. His subject was "Street Paving Materials and Their Use."

What Is Fame?

Answering a complaint from a passenger, of uncivil or negligent treatment by a conductor, an officer of the Metropolitan Street Railway, New York City, tells a reporter that the company is putting forth systematic and energetic efforts to bring the discipline of its men up to the highest possible standard; the present management took hold about four years ago, and has effected a very great improvement, weeding out inefficient men, stimulating and encouraging self-respect of the better class, and aiding in the support of the employees' association. And, says this officer, one of the principal instrumentalities in this work is Brown's discipline, "originated by Amos Brown, President of a small steam railroad in New England."

S. A. L. Trees, Farms and Factories.

The chief industrial agent of the Seaboard Air Line reports that for the fiscal year ending June 30, 1898, 94 enterprises have been established on the line of the road, consisting of 8 cotton factories, 13 canning factories, 5 clothing factories, 9 flouring mills, 3 spoke and handle factories, 3 furniture factories, 1 broom factory, 1 rope and twine factory, 1 shirt factory, 1 agricultural-implement factory, 1 bicycle, 2 buggy and wagon and 1 baking-powder factory, and 46 miscellaneous factories.

He further reports that 443 families have settled upon the line during the past year, bringing with them nearly \$1,000,000, and aggregating in number of persons over 2,000; also that there have been set out 224,000 fruit and shade trees at stations on the line during the year. Twenty-two experimental farms have been started during the year, and three agricultural libraries are being maintained through his department.

Coal Production in 1898.

The quantity of anthracite coal produced in the United States during the year 1898, according to the Coal Trade Journal, was 41,625,143 tons (December estimated). This is almost exactly the same as the production of 1897. In the earlier part of the year all the large companies made considerable effort to restrict their output, but in the latter part this policy was abandoned, and the market was so well supplied that prices remained low. The proportion produced by each of the companies was about the same as during 1897: Reading, 20.16 per cent.; L. V., 15.43; D. L. & W., 13.67; C. of N. J., 11.36; P. R. R., 11.45, etc. The Coal Trade Journal estimates the production of bituminous coal in the United States at 148,000,000 net tons a year, and this fuel, being widely distributed and very low in price, has crowded out anthracite in many fields.

LOCOMOTIVE BUILDING.

The Central Railroad of New Jersey will order from 10 to 15 heavy freight locomotives.

The Atchison, Topeka & Santa Fe has ordered 10 locomotives from the Dickson Locomotive Works.

The Norfolk & Western has placed an order with the Baldwin Locomotive Works for five consolidation locomotives.

The Erie has placed orders for 24 locomotives, having given 15 to Richmond Locomotive & Machine Works, five to Rogers Locomotive Co., and four to Baldwin Locomotive Works.

In our issue of Dec. 30 we stated that the Wisconsin Central had ordered seven locomotives from the Brooks Locomotive Works. These will be 10-wheelers, simple, weighing 149,000 lbs., with 155,000 lbs. on drivers. The cylinders will be 20 x 26 in.; drivers 63 in. in diam.; boiler, Belpaire type; working steam pressure, 200 lbs.; firebox, 113 in. long, 41% in. wide; tank capacity, 4,500 gals. They will have American and Westinghouse brakes, Low Moor iron axles, Gollmar bell ringer, American brake beams, Ross-Mehan brake shoes, Standard couplers, 18 in. round case headlights, No. 9 Monitor injectors, metallic piston rod and valve packings, Crosby safety valves, Leach sanding device, French springs, cast steel wheel centers and Brooks Locomotive Works improved piston valves.

The 10 10-wheel locomotives ordered by the Chicago Great Western from the Baldwin Locomotive Works, as previously mentioned in this column, are for March delivery. Five of them will be simple engines, with cylinders 20 x 28 in., and five will be four-cylinder compounds, with cylinders 16 and 26 x 28 in. They will weigh 163,000 lbs., of which 123,000 lbs. will be on the drivers, which will be 63 in. in diameter. The boilers will be of the extended wagon top type; working steam pressure 200 lbs.; fireboxes will be 112 in. long and 42 in. wide; tank capacity for water 6,000 gals., and coal capacity, 10 tons. Westinghouse and American brakes; Cambria axles; Kewanee brake beams, Tower couplers, Hancock injectors, Jerome metallic piston and valve rod packings, Ashton safety valves and steam gages, Leach sanding devices, Latrobe and Standard tires and cast steel wheel centers will be used.

CAR BUILDING.

As we go to press, the Central Railroad of New Jersey is about to let contracts for 2,500 cars.

We are informed, but not officially, that the Canada Atlantic will build 500 60,000-lb. box cars, probably at its own shops at Ottawa, Ont.

The order for cars placed with the Ensign Mfg. Co. by the Southern Pacific is as follows: Three hundred stock cars, 100 flat cars, 300 hopper bottom coal cars and 1,600 box cars, the total being 2,300 cars.

In our issue of Dec. 9 and again in our issue of Dec. 23, we stated that the Oregon Short Line was considering ordering freight cars. It is now reported that 300 will be steel cars, to be built by the Schoen Pressed Steel Co.

The Philadelphia & Reading has awarded contracts for 1,000 cars, as follows: Murray, Dougal & Co., 200; Middletown Car Works, 100; Lebanon Mfg. Co., 100; Michigan-Peninsular Car Co., 300, and Union Car Co., 300.

As mentioned in our issue of last week, the Chicago Great Western has ordered 700 box cars from the Michigan-Peninsular Car Co. These cars will be of 60,000 lbs. capacity, and will weigh 31,000 lbs. They will be 36 ft. long, 8 ft. 6 in. wide, and 7 ft. 2 in. high, and are for February and March delivery. They will have steel axles, Chicago Great Western I-beam bolsters, Kewanee brake beams, Westinghouse air brakes, Chicago couplers, Moore doors, American continuous draft rigging, McCord journal boxes, Chicago roofs, Latrobe springs and Barber trucks.

The contracts for the 300 cars mentioned in our issue of Dec. 9 have been let by the Columbus, Sandusky & Hocking: 100 box to the Mt. Vernon Car Mfg. Co., and 100 coal cars each to the Ohio Falls Car Mfg. Co. and the South Baltimore Car Works. They will all be of 60,000 lbs. capacity, and for delivery not later than March 15. The coal cars will be 38 ft. long and 9 ft. 6 in. wide outside, weighing 29,900 lbs. Buckeye trucks and bolsters and French springs will be used on all; Tower couplers will be used on the coal cars and Lone Star couplers and Winslow roofs on the box cars.

BRIDGE BUILDING.

BRIDGEPORT, CONN.—The Board of Aldermen has passed a resolution to ask the Legislature for authority to issue bonds for permanent improvements and for the Yellow Mill bridge, which is estimated to cost \$60,000.

BROOKLYN, N. Y.—The John Gillies Co., of Brooklyn, has been incorporated to build docks, bridges and wharves. The capital stock is \$10,000. The directors are John Gillies and Frank A. Crowe, of Brooklyn, and Henry P. Burr, of Amityville.

CARROLLTON, KY.—J. J. Orr, County Auditor, is reported as stating that a company has been organized to build a bridge across the Kentucky River.

CLEVELAND, O.—The diversion of the Cuyahoga River at the Lower Seneca St. bridge for the straightening of Seneca St. will require the removal of several bridges. The proposed improvements are estimated at \$200,000.

DAVENPORT, IA.—It is reported that the Chicago, Milwaukee & St. Paul is to build a steel viaduct at the Orphans' Home Crossing.

DE SOTO, MO.—The Jefferson County Court has ordered bids to be received for building a steel bridge 200 ft. long across the Big River, at Frumet. Jerome B. Dover, County Surveyor.

HASTINGS, NEB.—The Board of Supervisors of Adams county will receive bids for bridges for that county for the year 1899. The bids will be opened Jan. 10. Bids should be on all kinds of bridges, wood, iron, truss, pile and stringer. The board reserves the right to reject any and all bids. D. R. Bigelow, County Clerk.

HOLLISTER, CAL.—Plans have been adopted for the proposed bridge over San Benito River, south of Mulberry. It is estimated that the work will cost between \$1,500 and \$1,800. G. W. Foot, Clerk, San Benito County. (Dec. 2, p. 866.)

KAMLOOPS, B. C.—Engineer Gamble, in his report, recommends the immediate building of a bridge across Thompson River.

MALONE, N. Y.—The Ogdensburg & Lake Champlain, according to report, is to build a bridge across Lake Champlain. (See Railroad News column.)

MOUNDSVILLE, W. VA.—The Baltimore & Ohio, according to report, will petition the City Council for the privilege to change two overhead bridges. If permission is granted, new bridges will be substituted.

NEW YORK, N. Y.—The War Department has acted favorably upon the improvements on the Grand St. bridge, over Newtown Creek. A hearing in regard to the proposed changes and dimensions of the present structure is to be held in the Army Building Jan. 17, by Major H. M. Adams.

The Board of Aldermen has refused to authorize the issue of \$100,000 bonds to provide for the preliminary work on two new East River bridges, recently recommended by the Mayor. (Dec. 9, p. 883.)

Estimates have been secured by the New York Connecting Ry. Co., of which Oliver W. Barnes is President, for building a bridge and viaduct from Port Morris to Astoria by way of Randall's Island. The cost of this structure is estimated at \$4,000,000.

NORTH TARRYTOWN, N. Y.—The village of North Tarrytown will shortly make application for a bridge over the Pocantico River.

NORWOOD, O.—The County Commissioners have decided to build a new bridge over the Baltimore & Ohio Southwestern tracks on Montgomery Pike or Main St. The present bridge at that site is to be removed to Marion St.

PEMBROKE, ONT.—The report of Public Works Committee adopted by the City Council recommends the building of an iron bridge, to cost about \$7,500.

PITTSBURGH, PA.—Director of Public Works Bigelow, in his annual report, under Miscellaneous, asks for the rebuilding of the Haight's Run bridge, Lincoln Ave. bridge across Boulevard, Point bridge,

Wilmot St. bridge over Junction RR., South Main St. bridge and Bond St. bridge. This work was asked for in a former report. He says the time has come when either traffic must be stopped over these bridges or the bridges rebuilt. The following are the amounts needed on this work:

Point bridge, reconstructing	\$100,000
Wilmot Street bridge over Junction RR	25,000
Lincoln Avenue bridge across Boulevard	150,000
Haight's Run Bridge, on Butler street	110,000
South Main Street bridge across Sawmill Run	10,000
Bond Street bridge, across Negley Run	15,000
Total	\$410,000

PLACERVILLE, CAL.—It is reported that the American River Land & Lumber Co. is to rebuild several of the bridges on its line of railroad at Pine Grande, Eldorado county.

ROCKFORD, ILL.—A proposition to build a new bridge over Keith's Creek, at Seventh St., is being considered. The present structure is to be removed to a new site.

SACRAMENTO, CAL.—It is proposed to build during the coming summer the \$10,000 drawbridge across Georgiana Slough, at Walnut Grove, to connect Angrus Island with the mainland. J. C. Boyd, County Surveyor. (Sept. 23, p. 695.)

ST. PAUL, MINN.—The Great Northern will build several steel bridges during 1899, but nothing has been determined upon as to the character of the work or number of bridges. N. D. Miller, Chief Engineer, St. Paul.

ST. THOMAS, ONT.—Proposals are wanted by Jan. 24 for two iron bridges of 120 ft. span to cross Kettle Creek.

SYRACUSE, N. Y.—The West End Business Men's Association is endeavoring to have a new bridge built over the Erie Canal at Bridge St. R. R. Stuart, City Engineer.

TACOMA, WASH.—The proposed bridge across the Puyallup River will have a span of 160 ft. Nothing definite has been done in the matter. Norton L. Taylor, City Engineer.

WESTERLY, R. I.—A new bridge is to be built across the Seacottet River, between Portsmouth and Tiverton.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Buffalo, St. Mary's & Southwestern.—Annual, 6 per cent., payable Jan. 3.
Burlington, Cedar Rapids & Northern.—Preferred, 4 per cent., payable Jan. 16.
Canada Southern.—One per cent., payable Feb. 1.
Delaware, Lackawanna & Western.—Quarterly, 1% per cent., payable Jan. 20.
Lake Shore & Michigan Southern.—Semi-annual, 3½ per cent., payable Jan. 28.
Lower Schuylkill Navigation RR. & Coal Co.—Annual, \$1.25 per share, payable Jan. 12.
Michigan Central.—Semi-annual, 2 per cent., payable Jan. 28.
Texas Central.—Preferred, annual, 4 per cent., payable Jan. 16.

Wilkesbarre & Wyoming Valley Traction Co.—Annual, 1 per cent., payable Jan. 21.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:
American Society of Civil Engineers.—Meets at the house of the Society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month, at 8 p. m.
Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.
Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month at 7:30 p. m.
Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.
Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.
Chicago Electrical Association.—Meets at Room 1737, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, Secretary.
Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.
Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.
Denver Society of Civil Engineers.—Meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month, except during July and August.
Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Tuesday of each month, excepting July and August, at 6:30 p. m.
Engineers' Club of Columbus (O.).—Meets at 12½ North High street on the first and third Saturdays of each month from September to June.
Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.
Engineers' Club of Philadelphia.—Meets at the house of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month at 8 p. m., except during July and August.
Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.
Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.
Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month at 7:30 p. m.
Locomotive Foremen's Club.—Meets every second Tuesday in the club room of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7:30 p. m.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 8 p. m.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is Secretary.

Western Society of Engineers.

The annual meeting and dinner of the Western Society of Engineers was held Tuesday evening, Jan. 3, at the Technical Club, Chicago. The result of the election of officers and one trustee for the ensuing year was announced and was as follows: President, Onward Bates; First Vice-President, Prof. N. O. Whitney; Second Vice-President, T. L. Condron; Treasurer, C. W. Melcher; Trustee, A. Ziesing.

The Engineers' Club of Philadelphia.

A business meeting of the Club will be held on Saturday, Jan. 7, at 8 o'clock p. m. The tellers will announce the result of the election of members. The papers will be "The Reconstruction of the Reservoir for the York Pennsylvania Water Company," and "Notes Upon a New Power Improvement on the Niagara River," illustrated, by John Birkinbine. The nominations for officers for 1899 are: President, Francis Schumann; Vice-President, Henry Leffmann; Secretary, L. F. Rondinella; Treasurer, George T. Gwilliam; Directors, H. M. Chance, Clark Dillenbeck, William Penn Evans, Minford Levis, Charles Piez, Harrison Souder, W. L. Webb.

American Society of Civil Engineers.

The December Proceedings contain a paper on the Calumet & Hecla coal hoists, to be presented Jan. 4. It is by Mr. Julius Kahn, Jun., Am. Soc. C. E., and is not only pretty thorough in its treatment, but unusually well illustrated.

The same issue contains a memoir of Albert Fink, prepared by O. Chanute, Rudolph Fink and H. G. Prout, all members Am. Soc. C. E. This is a document of 14 pages, and is the most complete of the memorial notices of Mr. Fink which have appeared since his death.

In the same number of the Proceedings is a memoir of Mr. S. J. Cisneros, prepared by Mr. Theodore A. Leisen, M. Am. Soc. C. E.

Engineers' Club of Cincinnati.

The eleventh annual meeting of the Club occurred on the evening of Dec. 15, 1898, with an attendance of 25 members. Favorable action was taken in the matter of changes in the by-laws, providing for an increase in the annual dues and for a change in the time of calling the meetings to order.

Officers for the ensuing year were elected as follows: President, Schuyler Hazard; Vice-President, Thos. B. Punshon; Directors, A. O. Elzner, Wm. C. Jewett, L. E. Bogen; Secretary and Treasurer, J. F. Wilson.

The retiring President, Mr. Geo. W. Kittredge, gave a review of the doings of the Club during its existence.

The time of meeting for this Club is now 6:30 p. m. instead of 7:30 p. m., as formerly.

Northwestern Electrical Association.

The seventh annual meeting of this Association will be held at Hotel Pfister, Milwaukee, Wis., beginning Wednesday, Jan. 18. The following papers will be presented: "Trend of Central Station Design," by B. J. Arnold, Chicago; "Meter-Rate Systems," by E. L. Debell, Sheboygan, Wis.; "Design of Secondary Circuits in Alternating Plants," by George L. Thayer, Belle Plaine, Ia.; "Electricity Direct from Coal," by Prof. A. J. Rogers, Milwaukee; "Inductive Loads on Alternating Current Transformers," by Prof. D. C. Jackson, Wisconsin University; "Electric Vehicles and Their Relation to Central Stations," by H. M. Maxim, Hartford, Conn.; "Association Management," by H. L. Doherty, Madison, Wis. Mr. Frank L. Perry, of Chicago, will also give an illustrated lecture on "Curious Things Electrical." The Association will inaugurate, at this meeting, the "Question Box" on a new plan. The Hotel Pfister makes the usual reduced rates, and rooms and space for exhibits should be secured well in advance. The usual one and one-third fare on the railroads has been secured from the Western Passenger Association on condition that 100 certificates of attendance are presented, and Mr. James Wolff, 320 Dearborn St., Chicago, will have charge of transportation arrangements for delegates coming by way of that city. Mr. T. R. Mercelin, 22 Sentinel Building, Milwaukee, is Secretary and Treasurer of the Association.

PERSONAL

(For other personal mention see Elections and Appointments.)

—Passed Assistant Engineer Walter M. McFarland, at present attached to the Bureau of Steam Engineering of the Navy, as an assistant to Engineer-in-Chief Melville, has resigned to become Assistant General Manager of the Westinghouse Electric & Manufacturing Co., with headquarters at Pittsburgh.

—We are officially informed that Mr. Frederick D. Underwood, General Manager of the Minneapolis, St. Paul & Sault Ste. Marie, has been appointed General

Manager of the Baltimore & Ohio Railroad. Mr. Underwood is 48 years old and has been in railroad service continuously for 30 years. He has long been recognized as a man of much vigor and efficiency, and will doubtless worthily fill the place made vacant by Mr. Greene's promotion.

—Mr. Charles Hansel, M. Am. Soc. C. E., is made Manager of Sales and Installation of the Union Switch & Signal Co., as a result of the consolidation of the Union and the National. Mr. Hansel, as Vice-President and General Manager of the National, since it has been under the control of Mr. Thorne, has been very influential in building up the admirable manufacturing organization of that concern. In fact, he has a gift for organization, and we shall expect to see a remarkably efficient department of sales and installation built up for the consolidated companies.

—Mr. C. H. Hudson, who has just resigned as Chief Engineer of the Southern Railway, is one of the most widely known railroad men in the country. We do not know how long he has been in the service, but certainly he began his actual railroad work some time before 1860. He has been employed on the Chicago, Burlington & Quincy, the Chicago & Northwestern, the Baltimore & Ohio, the Chesapeake & Ohio, the East Tennessee, Virginia & Georgia, and half a dozen other railroads of less importance than these. For six years, up to August, 1894, he was General Manager of the East Tennessee, Virginia & Georgia, and the Memphis & Charleston; then he became General Manager of the Western System of the Southern Railway, and from May 1, 1895, until his resignation, he was Chief Engineer of that railroad, and from February, 1896, Mechanical Engineer. He is a graduate from the Engineering School of Harvard University, and his engineering work on railroads has covered everything from construction to motive power. Besides that, he has had an important experience in the transportation department and some experience in the traffic department.

ELECTIONS AND APPOINTMENTS.

Arkansas, Louisiana & Southern.—The officers of this company are as follows: F. H. Drake, President and General Manager; T. Crichton, Vice-President; S. G. Webb, Secretary and Treasurer; O. P. McDonald, Superintendent; B. S. Atkinson, General Traffic Manager. General offices, Minden, La.

Atchison, Topeka & Santa Fe.—John P. Whitehead, Comptroller, with headquarters at New York, has assumed the duties of the position of Transfer Agent, formerly held by James Walker, Jr., resigned.

C. J. Perry has been appointed Trainmaster at Winslow, Ariz.

Atlanta, Knoxville & Northern.—J. E. W. Fields, previously General Freight and Passenger Agent, has been appointed Traffic Manager, with office at Marietta, Ga. Effective Jan. 1, 1899. J. H. McWilliams is appointed General Passenger and Ticket Agent of this company. Mr. McWilliams continues to represent the Freight Department as Traveling Freight Agent, with headquarters at Knoxville, Tenn.

Avoyelles.—C. J. Carpenter has been appointed General Freight Agent and Auditor. His headquarters are at Marksville, La.

Baltimore & Ohio.—F. D. Underwood, General Manager of the Minneapolis, St. Paul & Sault Ste. Marie, has, we are officially informed, been appointed General Manager. He succeeds Wm. M. Greene. (Oct. 28, p. 785.)

Baltimore & Ohio Southwestern.—Wilbur Dubois will have charge of real estate matters in addition to insurance and tax matters, under the title of Real Estate and Tax Agent. His headquarters are at Cincinnati, O.

Chas. H. Howard, Superintendent of Terminals at Cincinnati, O., has resigned, and the position is abolished.

Bismarck & Potomac Valley.—At the first annual meeting of the stockholders, held at Martinsburg, W. Va., the following Directors were chosen: B. Gilpin Smith, Samuel Mason, Henry W. Stokes and Powell Evans, of Philadelphia, Pa.; Samuel B. Shank, Chris. R. Herr, B. H. Snavely and D. P. Herr, of Lancaster, Pa. (Railroad Construction, Nov. 11, 1898; p. 820.)

Buffalo & Susquehanna.—J. H. Goodyear, Chief Clerk in the office of the Master Mechanic of the Chicago Great Western, has been appointed Assistant General Superintendent of the B. & S., with headquarters at Buffalo, N. Y.

Carrabelle, Tallahassee & Georgia.—G. N. Saussy, having resigned to accept a position elsewhere, the office of General Freight and Passenger Agent is abolished. His headquarters were at Tallahassee, Fla. All correspondence as well as matters pertaining to rates or claims, together with agent's reports, heretofore sent to the General Freight and Passenger Agent, will hereafter be addressed to F. W. Armstrong, Auditor, at Tallahassee, Fla. Effective Jan. 1, 1899. The office of Western Agent, heretofore filled by H. P. Simmons, at Chicago, Ill., has been abolished.

Central New York & Western.—At the annual meeting of the stockholders, held in Angelica, N. Y., Dec. 27, the following new Directors were elected: Frank S. Smith, Frederick H. Mollenhauer and Frederick W. Frost.

Chattanooga Southern.—Geo. C. Plummer has been appointed Roadmaster, succeeding G. A. Odell, with headquarters at Chattanooga, Tenn.

Chesapeake Beach.—The officers of this company are as follows: Otto Mears, President and General Manager; John L. McNeil, Vice-President and Treasurer; A. H. Lewis, Acting General Freight and Passenger Agent. General offices, No. 1420 New York Ave., Washington, D. C.

Chicago & Northwestern.—C. W. Blodgett has been appointed Traveling Agent Freight and Passenger Departments, with office at Oshkosh, Wis., vice R. M. Johnson.

The jurisdiction of W. M. Burgard, General Agent at Buffalo, N. Y., has been extended to cover parts of Canada and the whole of New York state.

Chicago Great Western.—F. H. Tibbets, Assistant General Freight Agent, Chicago, has been transferred to St. Paul, Minn., to take the place recently vacated by S. O. Brooks. S. E. Stohr, heretofore General Eastern Agent, with headquarters at New York, has been appointed Assistant General Freight Agent at Chicago, succeeding Mr. Tibbets. C. H. Adair, heretofore New England Freight Agent, with headquarters at Boston, Mass., will succeed Mr. Stohr as General Eastern Agent at New York. E. M. Newbegin, heretofore New England Freight Agent of the Northern Pacific at Boston, Mass., has been appointed New England Freight Agent of the C. G. W., succeeding Mr. Adair.

Ralph Ramawell has been appointed Foreman of the shops at South Park, Minn. He succeeds T. H. Yorke. (Dec. 23, p. 923.)

Chicago, Indianapolis & Louisville.—The title of A. J. O'Reilly has been changed from Commercial Agent to General Agent. His office is at Indianapolis, Ind.

Chicago, Rock Island & Pacific.—L. G. Hastings, heretofore Secretary and Treasurer of the Chicago, Rock Island & Texas, has been appointed Assistant Treasurer, with headquarters at Topeka, Kan.

Chihuahua & Pacific.—Chas. Sheldon, heretofore General Manager and Treasurer of the Consolidated Car Heating Co. at Albany, N. Y., has been appointed General Manager of the C. & P., with headquarters at Chihuahua, Mexico. E. S. Safford has been heretofore General Manager and Chief Engineer.

Colorado & Northwestern.—C. B. Culbertson, in addition to his office of Secretary, has been elected Treasurer, vice Thos. R. Mann. His headquarters are at Girard, Pa.

J. T. Blair, General Manager, with headquarters at Boulder, Colo., has resigned.

Colorado & Southern.—Under the recent reorganization of the company, successors to the Union Pacific, Denver & Gulf, the following appointments have been made, effective Jan. 1, 1899: H. F. Parke, Superintendent Transportation and Telegraph; J. S. Turner, Superintendent Motive Power; W. E. Fowler, Master Car Builder; H. W. Cowan, heretofore Resident Engineer at Denver, Col., was appointed Chief Engineer; A. Zimmerman, Superintendent of Bridges and Buildings; W. H. Reno was appointed Special Agent; J. C. Cornell was appointed Time Inspector. The foregoing have headquarters at Denver, Col. The Division Superintendents are J. W. Dalbey, with office at Denver, Col.; F. C. Webb, with office at Trinidad, Col.; J. A. Rasbach, with office at Cheyenne, Wyo.; C. E. Zeniger, with headquarters at Como, Col.

Columbus, Sandusky & Hocking.—A. M. Salisbury, Supervisor of the Sandusky Division, with headquarters at Marion, O., has resigned. W. A. Van Frank, Supervisor of the Shawnee Division, with headquarters at Fultonham, O., has been transferred, succeeding Mr. Salisbury. C. R. Shepard has been appointed Supervisor of the Shawnee Division, succeeding Mr. Van Frank.

Darien & Western.—John S. Lane has been appointed General Manager, with headquarters at Darien, Ga. F. H. MacFarland, President of the road, has hitherto performed the duties of that office.

Delaware & Hudson Canal.—M. J. Nugent has been appointed Roadmaster of the Pennsylvania Division, with headquarters at Scranton, Pa.

Erie.—F. B. Lincoln has been appointed Superintendent of the Tioga Division, succeeding E. E. Loomis. F. H. Hicks has been appointed Terminal Agent at Salamanca, N. Y., succeeding F. B. Lincoln.

Guy Jeffries, hitherto Chief Dispatcher of the Chicago Division, has been appointed Trainmaster, to succeed H. D. McClelland.

Fitchburg.—A. C. Lorion, General Agent, of Worcester, Mass., having resigned, the duties will be assumed by John Gourley, Division Freight Agent at Boston.

Grand Trunk.—Charles Clark has been appointed Division Freight Agent, with headquarters at Detroit, Mich.

Illinois Central.—R. W. Schoyer has been appointed Traveling Passenger Agent, with headquarters at Atlanta, Ga.

W. R. Israel, Travelling Passenger Agent, has been transferred from Chicago, Ill., to Detroit, Mich.

International & Great Northern.—C. Hightower has been appointed Traveling Freight and Passenger Agent, succeeding W. T. Musick, with headquarters at Palestine, Tex. (Dec. 30, p. 937.)

Kansas City, Fort Scott & Memphis.—Samuel T. Fulton has been appointed Assistant to the President, with headquarters at Kansas City, Mo.

Kansas City, Pittsburgh & Gulf.—L. J. Polk, Live Stock Agent at Houston, Tex., has resigned and the office is abolished. W. H. Cogswell has been appointed a General Agent of the Port Arthur lines, with headquarters at San Antonio, Tex., and will assume the duties of the position of Live Stock Agent.

E. E. Smythe has been appointed First Assistant General Freight Agent, with headquarters at Kansas City, Mo.

Lehigh Valley.—Eugene Field has been appointed General Western Agent, with headquarters at St. Louis, Mo.

Manahawkin & Long Beach Transportation Company.—At the annual meeting, held in Philadelphia, Dec. 27, the only change made in the officers was that of Vice-President B. F. Archer, of Camden, N. J., succeeding Thomas Callahan as Vice President.

Mason City & Fort Dodge.—W. E. Tippett has been appointed Roadmaster, with office at Fort Dodge, Ia., succeeding George Kosler.

Michoacan & Pacific.—A. F. Selzer has been appointed Master Mechanic, with headquarters at Zitacuaro, Mex., succeeding E. W. Knapp, resigned.

Minneapolis, St. Paul & Sault Ste. Marie.—William Fitch, General Manager of the Duluth, South Shore & Atlantic, will succeed F. D. Underwood as General Manager when the latter leaves for Baltimore as General Manager of the B. & O. Mr. Fitch's future headquarters will be at Minneapolis, Minn.

Missouri Pacific.—C. A. Waterman, heretofore Acting Commercial Agent at San Antonio, Tex., has been appointed Commercial Agent at that point. C. G. Miller, heretofore General Agent of the Texas & Pacific at New Orleans, La., has been appointed Commercial Freight Agent at Cairo, Ill., succeeding M. P. Walsh, Jr., resigned.

Nashville, Chattanooga & St. Louis.—Claude Waller has been appointed General Counsel, succeeding E. H. East, with headquarters at Nashville, Tenn.

New York, Susquehanna & Western (Erie).—Frederick P. Moore, Third Vice-President, has resigned. Mr. Moore has been in charge of the coal interests for the past 15 years.

E. E. Loomis has been appointed Superintendent, with headquarters at Jersey City, N. J.

Norfolk & Western.—W. S. Becker has been appointed Assistant Trainmaster of the Pocahontas Division, with office at Bluefield, Va., succeeding A. C. Needles. (Dec. 30, p. 937.)

Oregon Short Line.—H. E. Van Housen, Superintendent of the Idaho Division, has resigned. He is succeeded by E. C. Manson, heretofore Chief Train Dispatcher. His headquarters are at Pocatello, Idaho.

Charles W. King has been appointed Chief Dispatcher of the Idaho Division, succeeding Mr. Manson.

Pennsylvania.—In addition to the changes already noted, L. W. Allibone has been appointed Superintendent of the Bedford Division, succeeding F. P. Abercrombie. The official title which F. Wolcott Jackson assumes is that of Resident Manager of the United Railroads of New Jersey Division, with office to be hereafter designated. H. F. Kenney, heretofore General Superintendent of the Philadelphia, Wilmington & Baltimore, has resigned, and is succeeded by E. F. Brooks. Mr. Kenney will perform executive duties in the management of the lines of the P. W. & B.

Peoria, Decatur & Evansville.—The position to which Geo. A. Smith is appointed is General Agent Freight and Passenger Departments, with headquarters at Peoria, Ill. He performs all the duties and has charge of the territory heretofore covered by the Assistant General Freight and Passenger Agent, held by S. J. Cassett. (Dec. 23, p. 923.)

Rome, Watertown & Ogdensburg (N. Y. C. & H. R.)—Samuel R. Calloway has been elected a Director, succeeding H. W. Webb.

Sacramento Valley.—J. P. Gardner has been appointed Assistant Engineer, with headquarters at Kingman, Ariz.

St. Louis, Iowa & Dakota.—W. H. Beck has been elected a Director, succeeding F. A. Seaman, resigned.

St. Louis Southwestern.—W. C. Watrous, heretofore Chief Clerk in the Car Service Department of the Great Northern, has been appointed Superintendent of Transportation, with headquarters at St. Louis, Mo.

Seaboard Air Line.—L. S. Allen, heretofore General Agent at Washington, D. C., has been appointed General Passenger Agent, succeeding T. J. Anderson, resigned. His headquarters are at Portsmouth, Va. W. M. M. Connell succeeds Mr. Allen at Washington.

Southern.—C. H. Hudson, Chief Engineer, with headquarters at Washington, D. C., has resigned. W. H. Wells has been appointed Engineer in charge of the Engineering Department. The office of Chief Engineer will be vacant until Major Hudson's successor is appointed.

M. A. Hays has been appointed Land and Industrial Agent, with office at Boston, Mass., succeeding L. Scott Allen.

Southern Indiana.—A. N. Sullivan has been elected Treasurer of this company, succeeding L. A. Walton, with headquarters at 185 Dearborn street, Chicago, Ill.

Stockton & Tuolumne.—At the annual meeting of the stockholders, held in San Francisco, Dec. 21, the following Directors were elected: Annie Klein Rikert, Hannah L. Lane, Chas. B. Kaufman, Chas. B. Stuart and Wm. H. Ware. C. B. Kaufman succeeded Jabin Clement as Vice-President, and Chas. B. Stuart succeeded Maggie Downing as Treasurer.

Texas & Pacific.—C. G. Miller, General Agent at New Orleans, La., has resigned. J. B. Faul, Superintendent of the New Orleans Division, with headquarters at New Orleans, has also resigned.

Washington County.—S. W. Haycock has been appointed Superintendent Princeton Division.

Wilmington & Northern (P. & R.).—The offices of the W. & N. have been removed from Wilmington to Philadelphia, Pa. The following officers have been elected: President, Colonel H. A. DuPont; First Vice-President, Theodore Voorhees; Second Vice-President, Charles E. Henderson; Treasurer, W. A. Church; Controller, Daniel Jones; Superintendent, A. G. McCausland; Secretary, E. B. Shuster; Purchasing Agent, J. D. Landis.

RAILROAD CONSTRUCTION, New Incorporations, Surveys, Etc.

ABERDEEN & ASHEBORO.—The company has completed its 14 miles of extension from Troy, N. C., south to Mount Gildead. (June 24, p. 466.)

ALABAMA & FLORIDA.—Grading is completed for the entire distance from Georgiana, Ala., southeast 28 miles to River Falls, and about three miles of track is laid. The line may be extended into Florida. (Aug. 26, p. 618.) E. L. More, of River Falls, Ala., is President. (Official.)

ALABAMA & TOMBIGBEE.—In addition to four miles of track built early last year from Fulton, Ala., east, the company has four miles more nearly ready for the rails. (June 24, p. 466.) The line as proposed

is to extend from Lower Peach Tree, Ala., east 37 miles to Coffeyville. G. R. Hannon, of Fulton, Ala., is General Manager. (Official.)

ARKANSAS CENTRAL.—Four miles of track is laid on the extension from Charleston, Ark., east toward Paris, and 14 miles more is ready for rail. The company proposes to build on from Paris to Dar-danelle, 45 miles. (Nov. 25, p. 352.) C. C. Godman, of Fort Smith, Ark., is President. (Official.)

ASHLAND & WOOSTER.—Track is reported laid for 10 miles between Apple Creek, O., and West Lebanon, and for 15 miles from Jeromeville to a point near Shreve, on this line, to Jewett, O., through Stark county, 52 miles, to Ashland. Grading is also completed on the gap into Ashland. (Nov. 18, p. 838.)

ATLANTIC, VALDOSTA & WESTERN.—In addition to the 24.62 miles of road built between Suwanee River and Fort Moniac, Fla., during the past year, the company has completed 4.9 miles of line from Haylow, Ga., northwest toward Valdosta, 20 miles. (Official.)

BIG FALLS.—This company has built during the year six miles of road from Junction to Narske, Wis. (Official.)

BOSTON & MAINE.—Press dispatches from New Hampshire state that a bill will be introduced in the coming Legislature of New Hampshire enabling the Concord & Montreal line of the B. & M. to build a connecting link from Manchester southwest about 10 miles via Bedford Center and Amherst to Milford. This extension has been under consideration for a number of years.

CALIFORNIA ROADS.—The Common Council of San Diego has extended a franchise for railroad rights along the water front from Jan. 1 to July 1. The franchise was given to U. S. Grant, Jr., and other men appointed by the Chamber of Commerce to work up a railroad project for some Eastern road desiring an outlet to the Pacific Coast. (Jan. 28, 1898; p. 71.)

CAMMALL & BLACK FOREST.—The company has completed the four miles of extension from Pump Station, Pa., east to Steeley's Camp, and is now building the extension west from Pump Station 3½ miles to Kinley Camp. (Sept. 30, p. 714.) The work is being done by the company. (Official.)

CANE BELT.—The company has completed the entire 11 miles from Eagle Lake, Tex., south via Lakeside, Matthews and McDow to Bonus. (June 24, p. 466.) W. T. Eldridge, of Eagle Lake, is Vice President and General Manager. (Official.)

CENTRAL VERMONT.—Surveys are completed and building is to begin at once on the spur of 2½ miles from Montville, Conn., to Palmertown, a manufacturing village. P. H. Fitzgerald, of New London, Conn., has the contract for grading, and the company will lay the track. The work is not difficult. The maximum grade is 3½ per cent, and the maximum curve is 13°. There will be one steel bridge of 17 ft. span. (Dec. 22, p. 923.) The work is being done by the New London Northern line. The 300 tons of rail needed are already bought. (Official.)

GEORGIA & ALABAMA.—The stockholders on Dec. 30 voted an increase of \$1,000,000 bonds for building the terminals at Savannah. (Nov. 4, p. 804.)

HOLLY RIVER AND ADDISON.—The company has completed 5½ miles of track from Holly, W. Va., to Diana on the proposed extension up the right fork

DALLAS, FORT WORTH & GULF.—This company, successor to the Dallas Terminal Ry. & Union Depot Co., has submitted an offer to the Dallas (Tex.) Commercial Club to raise \$35,000 in subscriptions on the promise that active work shall be begun within 30 days on the extension from Dallas to Fort Worth, 31 miles. (Nov. 4, p. 804.)

DAVENPORT, ROCK ISLAND & NORTHWESTERN.—In addition to the belt line around Rock Island, Davenport and Moline, and the Crescent bridge across the Mississippi, this company proposes, according to report, to build a spur line north to Clinton. John Lambert, of Moline, Ill., is President of the American Steel & Wire Co., which is interested in the railroad. (Nov. 11, p. 820.)

DECKERVILLE, OSCEOLA & NORTHERN.—Forrester & Warren, of Midway, Ark., have the contract for building 26 miles of this line from Wardell to Osceola. The company will build on from Osceola 65 miles to Paw Paw Junction. (Oct. 7, p. 732.) E. M. Ford, of Deckerville, is Vice-President. (Official.)

DES ARC & NORTHERN.—The company has completed this line from Higgins, Ark., southeast 20 miles to Des Arc. (Dec. 16, p. 903.)

DULUTH & NORTHEASTER.—The company has laid 27 miles of track from Lynd, Minn., south to Island Lake. The Duluth Logging Contracting Co. has the contract. (Official.)

DULUTH & NORTHERN MINNESOTA.—The company has completed 7.5 miles from Knife River, Minn., into the woods and has graded 3 miles more. No contracts have been let. Martin Smith, of Detroit, Mich., is President of Alger, Smith & Co., the company that is building the road.

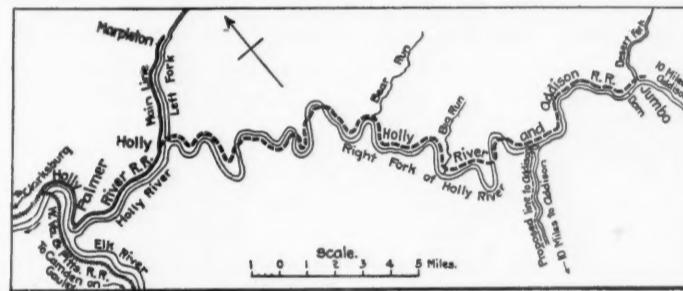
DULUTH, MISSISSIPPI RIVER & NORTHERN.—Track is laid on this line from Hibbing, Minn., to Dewey Lake, 15 miles, and it is proposed to extend it from Dewey Lake to Sturgeon Lake, 10 miles. (Sept. 2, p. 639.) I. N. Gray, of Swan River, Minn., is Chief Engineer. (Official.)

ESCANABA & LAKE SUPERIOR.—The company has built 30 miles of main line on this extension from Escanaba, Mich., northwest 60 miles to Republic. It has also built four miles of spurs. (Dec. 2, p. 867.) Isaac Stephenson, of Marinette, Wis., is President. (Official.)

EUREKA & KLAMATH RIVER.—The City Council of Eureka, Cal., on Dec. 27 passed an ordinance granting this company a franchise for 50 years over certain streets of that city, and work will be begun on the proposed extension soon. The company was incorporated in California Jan. 10, 1896, with a capital stock of \$50,000, and completed 11 miles of road that year from Mad River to Samoa, opposite Eureka. (July 17, 1896; p. 512.)

GEORGIA & ALABAMA.—The stockholders on Dec. 30 voted an increase of \$1,000,000 bonds for building the terminals at Savannah. (Nov. 4, p. 804.)

HOLLY RIVER AND ADDISON.—The company has completed 5½ miles of track from Holly, W. Va., to Diana on the proposed extension up the right fork



The Holly River & Addison's New Line in West Virginia.

CHESAPEAKE BEACH.—The company expects to have this line completed to Chesapeake Beach in February or sooner. Trains are running on the first 12 miles to Upper Marlborough from Washington, D. C. (Oct. 21, p. 768.) L. H. Hyer, 1420 New York Avenue, Washington, D. C., is Chief Engineer. (Official.)

CHICAGO & NORTHWESTERN.—President Hughitt is reported as saying to a delegation of Algonia (Ia.) business men that the company will begin building next spring a connecting line from Burt, a few miles north of Algonia, to run northwest about 100 miles to Sanborn, Minn., and that through trains will be run from South Dakota to Chicago.

CHICAGO, ROCK ISLAND & PACIFIC.—Official confirmation is received that this company has begun building a line from Chickasha, I. T., west about 50 miles via Andarko. The work is to be completed as soon as possible. (Dec. 23, p. 923.)

COLORADO VALLEY.—Irving H. Wheatecroft, of Sweetwater, Tex., President of this company, is reported as saying that grading is to be resumed from Oakhurst, Tex., and the road extended to Ballinger, Brady, Mason, Fredericksburg and Comfort, as soon as proper arrangements can be perfected. The road was completed from Sweetwater, Tex., to Oakhurst, 25 miles, during last year. (March 11, 1898; p. 188.)

COLUMBUS, BLOOMINGTON & TERRE HAUTE.—This company was incorporated in Indiana Dec. 29 with a capital stock of \$100,000, to build a railroad from Columbus west about 100 miles via Bloomington to Terre Haute. The incorporators are: Charles W. Shaw, John I. Bennett, P. B. Willoughby, Lon Giles, John Field, Mano Abbott, Joseph H. Daniels, Eli Boruff, John Bryant, Frank Moore, William N. Johnson, Edmond Allgood, Henry Myers, Martin L. Roush, Samuel Webb, George B. Giles and Frank Forsyth, all of Bloomington.

COOS BAY, ROSEBERG & EASTERN.—The company has completed 2.25 miles from Cemetery to Beaverton, Ore. (Aug. 26, p. 618.) It proposes to make an extension from Myrtle Point, Ore., to Roseberg, 70 miles. (Official.)

CRYSTAL RIVER.—The company has added five miles of new road during the year, completing its line to Redstone, Col., 18 miles from Carbondale. (Oct. 28, p. 786.) J. A. Kebler, of Denver, Col., is Vice-President and General Manager. (Official.)

of the Holly River to Jumbo, 22 miles. (Nov. 11, p. 820.) Geo. A. Hechmer, of Palmer, W. Va., is General Manager. (Official.)

JONESBORO, LAKE CITY & EASTERN.—The company has completed the extension from Lake City, Ark., east 16 miles via Monette to Leachville. It is proposed to extend the road from Leachville to Luzor, on the Mississippi River, 35 miles. (Sept. 30, p. 714.) A. J. Kerfoot, of Jonesboro, Ark., is General Manager. (Official.)

KANSAS & TEXAS COAL.—The company has completed three miles of line from Bevier, Mo., south to Mine 61 and is building eight miles more to Ardmore. The work is being done by the company. (June 3, p. 399.) Geo. B. Leighton, of St. Louis, Mo., is Vice-President. (Official.)

KNOXVILLE & SEIVILLE.—Application was made in Tennessee, Dec. 21, for a charter to build a railroad from Knoxville east about 20 miles to Seiville. The incorporators are H. T. Cooper, Knoxville; John M. Ross, J. C. Monday, Abner Monday, and Jesse S. Catrell.

LAKE MANITOBA RAILWAY & CANAL COMPANY.—The company has completed 55 miles of road on the extension from Sifton Junction, Man., north toward the Swan River country. (Dec. 23, p. 923.)

LICKING VALLEY.—Track is laid to Fugate, 3½ miles south of Yale, Ky., and the company proposes to extend from Fugate south four miles to Salt Springs. (July 15, p. 522.) C. H. Eaton, of Salt Lake, Ky., is General Manager. (Official.)

MANCHESTER CONNECTING.—This company was incorporated in Pennsylvania Jan. 3, with a capital stock of \$20,000, to build a connecting line in Allegheny City, between the Cleveland & Pittsburgh and the Pitt'sburgh & Western lines. Frank B. Smith, President; Severn P. Ker, Sewickley; John L. McCutcheon, Pittsburgh, and T. G. McCutcheon, Allegheny, and F. B. Smith are the Directors.

MARSHALL, TIMPSION & SABINE PASS.—The line which has been completed between Timpsion, Tex., and Carthage, 20 miles, was to be opened for traffic Jan. 1. (Sept. 2, p. 639.)

MEXICAN CENTRAL.—The company is making surveys for the line from Guadalajara south to Co-lima. (Oct. 21, p. 768.) There are two locating parties

in the field, one under H. L. Dort and the other under J. W. Anderson. (Official.)

MEXICAN ROADS.—The Mexican Government has granted a concession to E. C. Creel and F. Duclos, of Chihuahua, to build a railroad in the state of Chihuahua from Chihuahua City to the Santa Lulalia mines, 30 km. (18.6 miles). Work was to be begun Jan. 1.

MICHIGAN ROADS.—The East Jordan Lumber Co., of East Jordan, has completed its line from the mills at East Jordan south eight miles into timber. (Nov. 8, p. 804.)

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Track is laid as far as Streeter, N. D., 77.5 miles, on this extension from Kulu west toward Bismarck. (Official.)

MISCELLANEOUS COMPANIES.—The Redwood & Railroad Co., of California, was incorporated in Oregon, Dec. 24, with a capital stock of \$2,500,000 as a construction company. The incorporators are John McCracken, John R. Foster, R. L. Durham, Charles F. Beebe, Philip Metscham and W. S. Mason. The central office is at Portland, Ore.

MISSISSIPPI VALLEY.—Fifty miles is graded on the line from East St. Louis, Ill., south 145 miles along the east bank of the Mississippi to Cairo. No track is laid yet. The company proposes to build a branch from the main line east 12 miles to Murphysboro, Ill. (Official.) There is no connection between this company and the St. Louis, Grand Tower & Southern, referred to last week. Spencer Tompkins, of 927 Olive street, is Secretary and Attorney.

MISSOURI MIDLAND.—The people of Columbia, Mo., have given this company a bonus of \$20,000 and provided a right of way and terminal facilities in the city. It is proposed to connect Columbia with the Missouri, Kansas & Texas line at Jefferson City. Charles Wiggins, E. M. Kidder and Daniel B. Ely, of St. Louis, are the projectors.

NATCHEZ, COLUMBIA & MOBILE.—Track is laid for three miles from Norfield, Miss., east toward Columbia on the Pearl River. (Aug. 26, p. 619.) The company is doing its own work and proposes to finish seven miles more soon. (Official.)

NEW HAVEN & DUNBAR.—Two miles of road have been built during 1898 by this company between Hill Farm and Ferguson, Pa. (Official.)

NORTHERN PACIFIC.—Press reports state that the company will soon begin building a cut-off from Staples, Minn., northwest about 95 miles to Fertile. This would effect a saving of about 34 miles on the line between Duluth and Crookston, which would make the distance but a few miles longer than the Great Northern route by the new Foston cut-off.

PANAMA.—During the year the company has built two miles of road from Panama to La Boen, Panama. (Official.)

PEARL & LEAF RIVERS.—The company has completed a little over 12 miles, of which about eight miles forms a part of the main line from Hattiesburg, Miss., southeast toward Columbia on the Pearl River, 41 miles. The company expects to add about seven or eight miles more in the spring to the main line and perhaps more. The amount depends upon negotiations now in progress with competing lines. It is being built through the virgin forest, in which there are no important stations. The J. J. Newman Lumber Co., of Hattiesburg, has the general contract. (July 22, p. 538.) J. J. Newman, of Hattiesburg, is President. (Official.)

PECOS VALLEY & NORTHEASTERN.—The line is reported completed and in operation for 177 miles, leaving only 29 miles to be finished from Amarillo, Tex., southwest 206 miles to Roswell, N. M. (Dec. 2, p. 868.)

PORT ANGELES EASTERN.—This company has been incorporated in Washington with a capital stock of \$500,000 to build a railroad from Port Angeles, on the Port Townsend Southern line of the Pacific Coast, to run east about 30 miles to Junction City, Jefferson county. The trustees who will manage the affairs of the corporation until May 1 are William Martell, Port Angeles; John Lehman, Chicago; Arthur Shute, Ellsworth, Me., and Isaac C. Atkinson, Boston.

QUEEN ANNE'S.—The company has practically decided to build the extension from Queenstown, Md., north seven miles to Centreville. (Nov. 18, p. 839.)

RALEIGH & CAPE FEAR.—Track is laid for 16 miles on this line from Raleigh, N. C., southeast toward Lillington, 35 miles. (Sept. 9, p. 656.) John A. Mills, of Raleigh, is President. (Official.)

ST. LOUIS & NORTHERN.—This company was incorporated in Illinois Dec. 30, with a capital stock of \$25,000,000, to build a line from Marine, Ill., on the St. Louis, Peoria & Northern, to run south 50 miles via St. Jacobs, Summerfield, Mascoutah, Fayetteville and Marissa to Sparta on the Mobile & Ohio. It will cross the Kaskaskia River at or near Fayetteville. It is understood to be a project of the St. Louis, Peoria & Northern.

ST. LOUIS, FENTON & SOUTHWESTERN.—Grading is begun, according to report, on this proposed line from St. Louis, Mo., southwest 27 miles via Afton, Sappington and Fenton to Morris Mills. It is stated that 18 teams began work last month near Luxembourg. Thomas Sneed is President, J. B. Clayton, Secretary, and Victor Spiegelberg, General Manager. The main office is at St. Louis.

SALT LAKE & MERCUR.—The company is reported to have surveyors in the field for its proposed extension down Lewiston Cañon, Utah, northwest to West Dip. It was stated some months ago that an issue of \$300,000 bonds was being prepared for the extension. (July 15, p. 522.)

SCRANTON, HONESDALE & EASTERN.—An official of the Delaware & Hudson Canal Co. writes that his company is not interested in this rumored road from Honesdale, Pa., to Rondout, N. Y., and that all information the company possesses in regard to the matter is that which has been found in local newspapers. (Dec. 16, p. 904.)

SHELTON SOUTHWESTERN.—Track is laid for 5.5 miles on the extension of this line from Summit, Wash., southwest toward Prairie Lake. (July 1, p. 485.) Allen C. Mason, of Tacoma, Wash., is General Manager.

SHREVEPORT & RED RIVER VALLEY.—In addition to 45 miles from Shreveport, La., to Coushatta, the company has laid seven miles of track south from Coushatta, and will extend the line as far as Campi, 16½ miles from Coushatta. The Grigsby Construction Co., of Shreveport, has the contract. (Nov. 25, p. 853.) Geo. E. Otis, of Shreveport, is Chief Engineer. (Official.)

SIERRA OF CALIFORNIA.—Cyrus Moreing & Son, who have been grading for the San Francisco & San Joaquin Valley, have taken a contract for this company. It is proposed to abandon a portion of the present grade between Rosasco and Chinese Camp. By following the new route a number of high trestles will be avoided, and some sharp curves and steep grades eliminated. Work is to be begun about Jan. 20. The company is also rapidly at work on its extension from Oakdale to Jamestown. (Sept. 9, p. 656.)

SOUTH GEORGIA.—The line from Talloka, Ga., east seven miles to connect with the S. G. at Barnz, which has been referred to heretofore under New Roads (March 18, p. 208), is completed and is now operated as a branch of the S. G. (Official.)

TAVARES & GULF.—An extension of 6½ miles is being built by the company's forces from the terminus at Oakland, Fla., east to Ocoonee. The line now runs from Oakland northeast to Tavares. (Official.) W. B. Tucker, of Orlando, Fla., is General Manager. (Dec. 17, 1897; p. 898.)

TEXAS & PACIFIC.—The company has completed track laying on the line from Waskom, Tex., via Greenwood, La., to Reisor. (March 18, p. 209.) This takes the place of a leased line between those points. (Official.)

TEXAS CENTRAL.—The company is considering the question of extending its Albany branch northwest 40 miles. (Official.)

TIONESTA VALLEY.—This company has completed 8½ miles of road from Lamoniaville, Pa., into timber lands, and has four miles more building. Crage & Tench, 61 Terrace, Buffalo, N. Y., have the contract. (July 29, p. 555.) Isaac Horton, of Sheffield, Pa., is General Manager. (Official.)

TORRES & PRIETAS.—Fifty miles of track is laid from Torres, Mexico, east through the state of Sonora to Santa Cruz, and the company proposes to extend the line from Santa Cruz to Tiburon, 12 miles. (Oct. 7, p. 732.)

TORONTO, LINDSAY & PEMBROKE.—McLean & McCallum, barristers of Toronto, will make application to the Ontario Government for an incorporation to build a railroad from Bancroft, on the Irondale, Bancroft & Ottawa, to run northeast about 70 miles to Pembroke. The intention is to connect the Ottawa River at Pembroke with Toronto by way of the Irondale, Bancroft & Ottawa and the Grand Trunk.

TUSCARORA VALLEY.—Grading is completed for 17 miles on the extension of this line from Blair's Mills southwest 31 miles to McConnellsburg. (Dec. 9, p. 886.) The ties are being placed and about a quarter of a mile of track is laid. (Official.)

VERA CRUZ & PACIFIC.—Alfred Bishop Mason, formerly of 7 Pine St., New York, the concessionnaire of this road, has bought a line from Cordova to Motzorongo, which will be used as a part of the main line from Cordova to Vera Cruz. Surveys are being made from Motzorongo to a junction with the branch line from Vera Cruz and have been completed from Vera Cruz to a point 30 km. south of the Papaloapan River, and also from Santa Lulalia on the National Tehuantepec northward for about 40 km. It is expected that the entire line will be located in March, and that when Mr. Mason returns in January from Chicago to Mexico City, he will be ready to call for bids. (Dec. 9, p. 886.)

WASHINGTON COUNTY.—This entire line is completed, and trains began running Jan. 2 from Washington Junction, Me., on the Maine Central, northeast along the coast via Eastport Junction to Calais, 102 miles, and to Eastport, 16 miles. Work was begun early last year. (Nov. 4, p. 804.)

WASHINGTON ROADS.—The Mason County Logging Co. has invited bids for building 4½ miles of standard gage railroad from the Black Hills to Little Rock, connecting with the Northern Pacific, and so to Olympia.

WEST VIRGINIA CENTRAL & PITTSBURGH.—The extension from Beverly, Md., south 11 miles to Huttonsville, is reported nearly completed. Grading was begun June 20. (July 1, p. 485.)

WYOMING & MISSOURI RIVER.—Track laying is completed on this line from Belle Fourche, N. D., up the Hay Creek Valley, 17.33 miles to Aladdin, Wyo. (Nov. 11, p. 821.) Geo. M. Nix, of Belle Fourche, is President. (Official.)

YELLOW RIVER.—The company is putting in three new switches for mills and turpentineries and has laid one mile of track with heavy rail. It is building a "Y" at one end of the line. An extension is projected from Florala, Fla., northeast about 40 miles to Elba. The line now runs from Crestview north 27 miles to Florala. (Official.)

YELLOWSTONE PARK.—This company, which is building its Gallatin line in Montana, has taken out articles of incorporation in that state and the capital stock is placed at \$1,500,000. The company was incorporated in Washington some months ago. (Sept. 30, p. 715.) W. W. D. Turner, of Spokane, Wash., is President.

Electric Railroad Construction.

ASHCROFT, B. C.—John Shields and John B. Leighton, representatives of the Ashcroft Water Works Co., are endeavoring to secure permission to build electric railroads and supply the power from their works in Ashcroft.

BALTIMORE, MD.—The Commissioners of Montgomery county have granted a right of way to the Washington & Rockville Ry. Co., of Montgomery county, over the Rockville & Bethesda Turnpike and part of the Georgetown road. The railroad company is to pay the County Commissioners \$600 per mile as compensation for the franchises.

The Baltimore, Middle River & Sparrow's Electric

Ry. has let a contract to J. G. White & Co., of Baltimore, and 28 Broadway, New York, for an extension to connect with the Fairmount Ave. line of the Central Ry.

BOSTON, MASS.—A petition prepared by the citizens of Boston will be presented to the next Legislature for an act to authorize the West End St. Ry. Co. (Boston Elevated RR.) to replace its tracks on Tremont St. and Boylston St., which were removed in accordance with the order of the Boston Transit Commission.

BRANFORD, CONN.—The Branford Electric Co. has organized the Branford Electric RR. Co., with a capital stock of \$200,000, to build an electric railroad to East Haven. A. M. Young, President.

BUCYRUS, O.—W. E. Haycox, of Mansfield, O., filed in the County Court, Dec. 31, the bond of the Bucyrus-Galloway Electric Ry. Co. It is expected that work on the line will be begun early in the spring.

BUTTE, MONT.—The Butte Consolidated Ry. Co., according to report, has in contemplation an extension of the Centerville line to Walkerville, work to be begun as soon as right of way is granted. The company now operates 15½ miles of electric railroad. J. R. Wharton is Receiver.

CHATTANOOGA, TENN.—The Chattanooga Electric Ry. Co. is reported to be considering the advisability of an extension of its Carter St. line to the factories west of Cameron Hill. J. H. Warren, President.

CHICAGO, ILL.—Now that the money has been secured for the completion of the Northwestern Elevated RR. work is to be pushed, and it is stated the road will be in operation by October next. (Dec. 16, p. 906; Dec. 30, p. 940.)

CLEVELAND, O.—There is a probability of either the Cleveland City RR. or the Cleveland Electric Ry. extending their lines, at the request of the West Side citizens, who are eager to have the road built to the western part of the city.

CORUNNA, MICH.—W. E. Avery, of Detroit, Mich., and D. L. Davis, of Pontiac, have been granted a 30-year franchise by the Common Council of Flint for the Long Lake, Durand & Corunna St. Ry. Co., which is to connect with the Owosso & Corunna Traction Co.'s lines. Work is to begin on the line by March 1. (Durand, Aug. 19, p. 603; Corunna, Nov. 25, p. 853.)

CUMBERLAND, MD.—The proposed line of the Cumberland & Frostburg, the Frostburg & Lonaconing, and the Lonaconing & Westernport railroads will be 27 miles, and run between Cumberland and Westernport, Md. Contracts will be let the latter part of March or early April for the building of the road. Sixty-pound T rails are to be used. E. F. Walker, President; John Burchinal, Vice-President; G. D. Howell, Secretary; I. A. Walker, Treasurer. Mr. Howell is also the engineer of the company. (Dec. 23, p. 924.)

EASTON, PA.—The Easton & Nazareth St. Ry. Co. was granted a charter Dec. 30 to build an electric railroad 10 miles in length, connecting the places named. The capital stock is \$60,000. William Q. Hay, President. Edward J. Fox, Robert A. Stofflet, Thomas A. H. Hay, Easton, and Charles H. Cox, Bethlehem, and W. O. Hay are the Directors.

ELIZABETH, N. J.—The Westfield & Elizabeth Electric Ry. has made application in Roselle, N. J., for a franchise to build through that place. (Dec. 9, p. 886.)

ELMIRA, N. Y.—H. N. Herbet, Chief Engineer, Bound Brook, N. J., is reported as stating that the Elmira & Seneca Lake Ry., which is to be built between Watkins and Horsesheads, will be 17 miles long, and it is expected to be in operation by May 15. Final contracts are now being made. John E. Mulford, President, Montour Falls, N. Y. (Dec. 30, p. 939.)

EL PASO, TEX.—B. F. Hammett, H. R. Wood, J. A. Smith, P. F. Edwards and others have secured a franchise for 50 years for an electric railroad through streets of El Paso, also to build an electric lighting plant. (Nov. 25, p. 853.)

GALENA, MO.—A. H. Rogers, Joplin, Mo., President of the Southwest Missouri Electric Ry. Co., is reported to have stated that his company will shortly build an extension to Empire City, Riceville and Spring Cove, and also that a power house will be built at Galena.

HAMILTON, O.—The Hamilton & Eaton Electric St. Ry. has made application to the County Commissioners for a franchise to build a double track road through Hamilton county over the Rossville and Eaton Pike. J. E. Anderson, President. (Dec. 30, p. 939.)

HARTFORD, CONN.—The Torrington & Hartford Tramway Co. will apply to the General Assembly at its next session for a franchise to extend its line to East Richfield and to Bantan Lake. L. Bogardus, of Torrington, is interested. (July 8, p. 503.)

IOLA, KAN.—The Iola Rapid Transit Co., which was incorporated last May, has begun work on the proposed line which is to run from Iola to Moran. A. M. Beach, Secretary. (June 17, p. 445.)

KANSAS CITY, MO.—According to report, the Metropolitan St. Ry. will practically rebuild the Ninth St. cable line in the spring, changing it to electricity.

KENOSHA, WIS.—John W. Wagner, in behalf of the Kenosha Traction Co., has applied for a franchise for additional right of way. The proposed road is to connect with a road now building from Waukegan to Evanston, Ill.

LEOMINSTER, MASS.—The State Railroad Commissioners have permitted the Fitchburg & Suburban St. Ry. to cross the N. Y., N. H. & H. tracks at grade on Water St., on condition that another crossing 700 feet distant be abolished. H. L. Pierce, Leominster, Mass.

LOGANSPORT, IND.—A company has been formed with a capital stock of \$100,000, with Geo. J. Marott as President, to build an electric railroad between Logansport and Indianapolis. Application for right of way has already been asked.

LOS ANGELES, CAL.—The Los Angeles Ry. Co. has filed a petition with the City Council for the sale

of street railroad franchise over Eleventh and Figueroa Sts. and Sentous St. to Hoover St. This application is identical with the application of the Los Angeles Traction Ry., which asks for the sale of a franchise over this route.

T. E. Gibon, Vice-President of the Los Angeles Terminal Ry., states that contracts for changing the Glendale branch to an electric line will be signed shortly, and work soon be begun thereafter. (Aug. 26, p. 619.)

MARION, IND.—The Kokomo St. Ry. Co. has filed a petition with the Commissioners of Tipton and Hamilton counties for right of way for an electric railroad between Tipton, through Atlanta, Arcadia and Cicero to Marion. E. H. Shirk, President of the Tipton National Bank, is reported as interested in the proposed line. Chas. L. Harry, Superintendent.

MIDDLEBORO, MASS.—According to report, the Washington & Middleboro St. Ry. Co. has been granted a franchise at Lakeville, Mass. The proposed route of the road is from Washington six miles to Lakeville. Chas. H. Wilson, President, Exchange Bldg., Boston, Mass. (Dec. 23, p. 924.)

MONTGOMERY, PA.—The Montgomery & Chester Electric Ry. Co., which was recently incorporated, has let a contract to the Fairmount Construction Co., 723 Walnut St., Philadelphia, Pa., for the building of the proposed road. The road is to be 15 miles long, connecting Pottstown and Phoenixville, via Limerick Square and Spring City. John I. Ridgway, President, Philadelphia. (Dec. 16, p. 905.)

MONTPELIER, VT.—The town of Waitsfield, Mass., has issued \$19,000 in bonds to aid in building the Mad River Valley Electric Ry., to run from Montpelier, Vt. to Warren, via Middlesex and Waitsfield, about 26 miles. F. C. Kennedy, President, Burlington, Vt. A. O. Humphrey, of Montpelier, is also interested. (Sept. 2, p. 639.)

NEW CASTLE, PA.—The Youngstown & New Castle Electric Ry. Co. was chartered Dec. 29 to build 12 miles of electric railroad from the city of New Castle to the Pennsylvania and Ohio state line. The capital stock is \$75,000. David L. Miller, President. Edward P. Geary, William A. Miller, James H. Mussina and George Q. Miller, Lock Haven, Pa., and D. L. Miller are the Directors.

NEW ORLEANS, LA.—The Algiers & Gouldsboro & Gretna RR. Co. has changed hands, and A. Rouprich, of McDonoughville, is in charge of the company. It is reported that many improvements are contemplated.

NORFOLK, VA.—The Norfolk & Atlantic Terminal Ry., according to report, has asked for a franchise to build an electric railroad in the city. The proposed road is from Norfolk to a point on Chesapeake Bay, about opposite Old Point Comfort. D. Lowenburg, President, Norfolk.

OAKLAND, CAL.—The San Pablo Ave. cable road, which is owned by the Southern Pacific, is soon to be changed to an electric line. It is said that an electric branch is also to be built on Park Ave. to the Oakland race track.

PASADENA, CAL.—The Board of City Trustees will receive propositions until Jan. 17 for a franchise to build and operate a single track electric railroad in Pasadena. This is the franchise which two street railroad companies have asked to have sold at auction.

PEORIA, ILL.—The Central Ry. Co. has petitioned the City Council for permission to build two branch lines, one to start from its present tracks on Main St. and Boulevard St., the other on Depot St. If the franchise is granted the work is to be finished in 90 days.

PHILADELPHIA, PA.—The Philadelphia & West Chester Traction Co. has completed its line between Philadelphia and West Chester. This road has been in operation between Sixty-third St. and Market St., 4½ miles from the City Hall, to Newtown Square, about three years. The road is being built under an old charter which permits them to carry freight.

PLAINFIELD, N. J.—The City Council on Dec. 29 granted a franchise to the Plainfield Ry. Co., which permits that company to complete the last connecting link in its line between New Brunswick and Newark. (Dec. 23, p. 924.)

PORTLAND, ORE.—The franchise owned by Graham-Glass, C. E. Smith and Adolph Dekum, for an electric railroad on First St., has been extended one year from Jan. 18; \$20,000 has already been expended on the work.

RIVERSIDE, CAL.—The Riverside & Arlington St. Ry. has petitioned the City Trustees for a franchise on Seventh St. to Park Ave., and thence to Victoria Hill, instead of the franchises which they now possess for a road on Fourteenth St. President, S. E. Evans.

SAN FRANCISCO, CAL.—Work is begun on the Market St. Ry. line from Stanyan and Haight St. About 100 men are engaged. It is expected that it will be completed and ready for service by Feb. 1. The line will probably later be extended in the direction of the almshouse. H. E. Huntington, President. (Dec. 2, p. 869.)

WALTHAM, MASS.—The Waltham Board of Aldermen on Dec. 28 granted a franchise to the Lexington & Boston St. Ry. Co. for a road on Lexington St. to the Lexington town line. The company is to have cars running by Aug. 1. (Dec. 30, p. 939.)

GENERAL RAILROAD NEWS.

Railroad Earnings.

Showing the gross and net receipts for the periods ending at the dates named:

Oct. 31.	1898.	1897.	Inc. or Dec.
Central Pacific.			
1 month.....	Gross \$1,601,743	\$1,523,391	I. \$78,352
1 " "	Net 718,696	765,301	D. 36,405
4 months.....	Gross 5,838,630	5,826,587	I. 12,043
4 " "	Net 2,514,892	2,879,470	D. 364,578
Houston & Texas Central.			
1 month.....	Gross \$556,245	\$341,719	I. \$214,526
1 " "	Net 340,950	161,377	I. 179,573
4 months.....	Gross 1,474,886	1,203,935	I. 270,951
4 " "	Net 746,256	494,426	I. 251,830

Nov. 30.	1898.	1897.	Inc. or Dec.
Buffalo, Rochester & Pittsburgh.			
1 month.....	Gross \$340,710	\$322,099	I. \$18,610
1 " "	Net 135,511	125,132	I. 10,379
5 months.....	Gross 1,716,627	1,613,043	I. 103,584
5 " "	Net 621,115	596,140	I. 24,975
Canadian Pacific.			
1 month.....	Gross \$2,524,497	\$2,540,451	D. \$15,954
1 " "	Net 1,080,509	1,189,733	D. 109,224
11 months.....	Gross 23,467,860	21,726,792	I. 1,741,068
11 " "	Net 9,196,260	9,250,321	I. 54,061
Central of New Jersey.			
1 month.....	Gross \$1,221,991	\$1,154,651	I. \$67,340
1 " "	Net 557,514	495,602	I. 61,912
11 months.....	Gross 11,561,422	11,635,166	I. 83,744
11 " "	Net 4,593,344	4,512,851	I. 50,493
Chesapeake & Ohio.			
1 month.....	Gross \$1,020,123	\$1,007,505	I. \$12,618
1 " "	Net 342,340	331,346	I. 10,994
5 months.....	Gross 5,127,712	4,909,964	I. 217,748
5 " "	Net 1,774,617	1,660,648	I. 113,969
Chicago, Burlington & Quincy.			
1 month.....	Gross \$3,980,439	\$3,803,293	I. \$177,141
1 " "	Net 1,707,661	1,470,389	I. 237,272
5 months.....	Gross 19,684,992	19,471,863	I. 213,129
5 " "	Net 8,307,714	8,299,745	I. 7,969
Chicago Great Western.			
1 month.....	Gross \$476,951	\$474,147	I. \$2,804
1 " "	Net 147,948	139,182	I. 8,666
5 months.....	Gross 1,720,383	1,513,319	I. 207,064
5 " "	Net 582,152	578,158	I. 33,994
Denver & Rio Grande.			
5 months.....	Gross 2,489,692	2,388,094	I. 91,598
1 month.....	Gross \$349,906	\$308,165	I. \$41,740
1 " "	Net 352,522	313,576	I. 39,248
5 months.....	Gross 4,058,573	3,714,548	I. 34,025
Erie System.			
1 month.....	Gross \$2,948,480	\$2,956,020	D. \$7,540
1 " "	Net 783,992	719,192	D. 30,200
5 months.....	Gross 14,567,659	15,447,688	D. 880,009
5 " "	Net 4,375,274	4,509,867	D. 134,533
Long Island.			
1 month.....	Gross \$318,972	\$306,515	I. \$12,457
1 " "	Net 78,451	76,726	I. 1,725
5 months.....	Gross 2,441,108	2,204,322	I. 236,786
5 " "	Net 942,646	866,322	I. 76,324
Long Island System.			
1 month.....	Gross \$331,193	\$316,072	I. \$15,121
1 " "	Net 75,189	70,159	I. 5,030
5 months.....	Gross 2,696,934	2,446,179	I. 250,755
5 " "	Net 1,057,204	983,351	I. 73,853
Louisville & Nashville.			
1 month.....	Gross \$2,099,004	\$1,841,650	I. \$257,354
1 " "	Net 831,461	607,860	I. 223,601
5 months.....	Gross 9,837,260	9,148,537	I. 688,723
5 " "	Net 3,376,565	3,103,962	I. 272,603
Mexican Central.*			
1 month.....	Gross \$1,234,522	\$1,128,734	I. \$105,788
1 " "	Net 507,938	398,287	I. 109,651
11 months.....	Gross 12,209,244	11,620,709	I. 588,535
11 " "	Net 3,880,103	3,540,804	I. 339,299
Mexican currency.			
New York, Ontario & Western.			
1 month.....	Gross \$351,134	\$348,247	I. \$2,887
1 " "	Net 108,997	111,315	I. 2,318
5 months.....	Gross 1,808,840	1,869,839	D. 61,099
5 " "	Net 556,473	614,299	D. 57,826
Norfolk & Western.			
1 month.....	Gross \$1,006,955	\$909,956	I. \$96,999
1 " "	Net 345,540	277,726	I. 67,814
5 months.....	Gross 4,907,587	4,793,132	I. 114,454
5 " "	Net 1,684,147	1,538,216	I. 145,931
Northern Pacific.			
1 month.....	Gross \$2,826,096	\$2,640,483	I. \$185,613
1 " "	Net 1,754,292	1,706,709	I. 47,533
5 months.....	Gross 12,771,467	11,604,998	I. 1,172,469
5 " "	Net 7,452,914	6,534,258	I. 918,655
Oregon Railroad & Navigation Co.			
1 month.....	Gross \$700,175	\$662,062	I. \$38,113
1 " "	Net 297,726	311,329	D. 13,603
11 months.....	Gross 6,577,362	5,063,029	I. 1,514,933
11 " "	Net 2,658,475	2,202,481	I. 455,994
Pacific Mail (Pacific Coast Co.).			
1 month.....	Gross \$334,797	\$338,079	D. \$2,282
1 " "	Net 122,572	71,831	I. 50,741
7 months.....	Gross 2,595,923	2,313,065	I. 282,858
7 " "	Net 1,027,993	420,651	I. 577,342
Pennsylvania.			
1 month.....	Gross \$5,826,024	\$5,819,924	I. \$6,100
1 " "	Net 1,985,358	1,960,658	I. 24,700
11 months.....	Gross 59,866,608	58,605,208	I. 1,251,400
11 " "	Net 18,957,665	18,867,465	I. 90,200
Pennsylvania Co.			
1 month.....	Gross .....	.....	I. \$5,500
1 " "	Net .....	.....	I. 254,500
11 months.....	Gross .....	.....	I. 2,401,700
11 " "	Net .....	.....	D. 635,800
Philadelphia & Reading.			
1 month.....	Gross \$2,185,461	\$1,924,717	I. \$260,744
1 " "	Net 1,000,366	932,410	I. 67,956
5 months.....	Gross 9,987,693	9,938,578	I. 49,115
5 " "	Net 4,412,038	4,687,532	D. 275,494
Philadelphia & Reading Coal & Iron Co.			
1 month.....	Gross \$2,476,571	\$2,227,058	I. \$249,513
1 " "	Net 1,225,517	117,562	I. 108,397
5 months.....	Gross 9,767,429	11,357,894	D. 1,590,465
5 " "	Net 635,208	737,634	D. 52,426
St. Louis & San Francisco.			
1 month.....	Gross \$660,680	\$612,558	I. \$48,112
1 " "	Net 283,517	269,834	I. 13,683
5 months.....	Gross 3,068,682	3,066,033	I. 32,649
5 " "	Net 1,305,476	1,399,354	D. 93,873
Union Pacific.			
1 month.....	Gross \$1,960,028	\$1,837,194	I. \$122,844
1 " "	Net 879,783	715,910	I. 163,873
5 months.....	Gross 8,822,357	8,492,932	I. 383,875
5 " "	Net 4,098,519	3,124,691	I. 973,828
ALLEGHENY & WESTERN.			
—A mortgage has been filed by this company			

Herckenroth, McKee Dunn McKee, Walter S. Jenks and Charles A. Watrous of New York City; Richard S. Storrs of Orange, N. J., and E. G. Woodbury of Cranford, N. J.

The line runs from Jamestown to the Western New York and Pennsylvania Junction, 21.17 miles, with a branch from Mayville to Chautauqua, 2.68 miles. (Nov. 4, p. 806.)

LITCHFIELD, CARROLLTON & WESTERN.—Johnson Bros. & Faught, of St. Elmo, Ill., who bought this property at foreclosure sale Nov. 26, sold it on Dec. 30 to Col. Henry S. Carroll, President of the road, and to David R. Francis, of St. Louis, for \$85,000, the amount of their bid. The approval of the sale was made by Judge Allen and the property turned over to the new purchasers at midnight, Dec. 31. A receiver was appointed May 23, 1894. (Dec. 2, p. 870.)

MARICOPA & PHOENIX & SALT RIVER VALLEY.—Under this name the Maricopa & Phoenix and the Phoenix, Tempe & Mesa have been consolidated and reorganized. The holders of 6 per cent bonds of the old M. & P. are requested to surrender the same at the company's office in San Francisco, or to the Farmers' Loan & Trust Co., New York, and to receive in exchange for the 5 per cent bonds of the new company at the rate of six new bonds for five of the old bonds.

NEW YORK, LACKAWANNA & WESTERN.—Redmond Kerr & Co., of New York, are offering the new \$4,000,000 terminal 4% bonds recently taken by them at 108 and accrued interest. (Dec. 30, p. 940.)

NEW YORK, PHILADELPHIA & NORFOLK.—The Reorganization Committee has given notice to the holders of receipts for the first mortgage bonds that six months' interest, as provided by the plan of reorganization, will be paid by Messrs. Cassett & Co. on and after Jan. 1. (June 17, p. 446.)

A special meeting of the stockholders is called for Jan. 24, "for the purpose of taking such steps as may be necessary in the reorganization of the company, including the approval of the issuance of first mortgage bonds to the extent of \$3,000,000, and of income bonds to the extent of \$1,000,000, and of securing the same by mortgages of the company's franchises and property. The stockholders will also be asked to pass upon the question of reducing the par value of the stock from \$100 per share to \$50 per share. Other measures necessary in the reorganization may also be presented."

OGDENSBURG & LAKE CHAMPLAIN.—Press reports state that the stocks and bonds of this company have been bought by the Rutland, which is making arrangements to run an extension up to the north end of Lake Champlain, where connection will be made with the Ogdensburg road. The O. & L. C. was sold to the bondholders May 2, and passed from the control of the receiver on Dec. 1. (Dec. 9, p. 887.)

OREGON RAILWAY & NAVIGATION.—Holders of first mortgage 2 per cent. bonds are notified that 159 of the same have been drawn by lot for account of the sinking fund and are payable at par at the Farmers' Loan & Trust Co., New York, interest to cease after Jan. 1.

PEORIA, DECATUR & EVANSVILLE.—The Scudder committee has issued a plan of agreement amending the one issued May 26, 1897, which provides for the paying off of one or both of the two issues of first mortgage bonds, as may be decided best. Depositors of stock, upon presentation of their certificates, will receive back their stock and the payments made thereon, and depositors of first mortgage bonds, upon presentation of the certificates and the payment of moneys advanced by the committee, will receive back their bonds. The second mortgage bondholders who have paid the first installment of \$40 per bond, may sell their bonds until Feb. 1 at \$150 per bond and receive back the \$40 paid thereon, after the plan has been declared operative, or they may receive 50 per cent. of their holdings in new common stock when issued and their \$40 paid in, and also be entitled to buy from the Trust Co. a certain amount of new and preferred stock as provided in the amended plan. Holders of second mortgage bonds who permit their bonds to remain under the new agreement, will receive \$140 for each bond. The syndicate agrees to buy the property of the Peoria Division clear of all mortgage and encumbrances, and will also buy the property of the Evansville Division, if it so chooses. It may issue as many bonds and as much preferred stock as it may see fit, subject to the following conditions: If it acquires only the Peoria Division, interest charges on the property shall not exceed \$70,000 per year, and dividends on the preferred stock and interest charges shall not exceed \$130,000 per year. If the Evansville Division is also bought, interest charges on the entire property shall not exceed \$140,000, and interest charges and dividends on preferred stock shall not exceed \$190,000. The syndicate further agrees to furnish \$500,000 to be expended on the property during the next five years in addition to amounts derived from the earnings of the property. The amount of new common stock is fixed at \$3,000,000, but the amounts of bonds and preferred stock and the rate of interest have not been decided. Feb. 1 is the time limit set for coming into the plan. (Nov. 11, p. 822.)

PHILADELPHIA & READING.—This company has arranged to scale down the interest rates on the Philadelphia, Newtown & New York Company's bonds to 3 per cent., and to discharge the three overdue coupons at the same rate. The loan is for \$1,408,000, of which the Reading owns \$849,100. An arrangement is in progress looking to the adjustment of the defaulted interest of the Philadelphia & Frankfort.

PHILADELPHIA, READING & NEW ENGLAND.—Superintendent W. J. Martin, of Hartford, Conn., is quoted as authority that the road, which was sold at foreclosure at Poughkeepsie, Oct. 6, to the Reorganization Committee for \$3,897,000 (Oct. 14, p. 752), is to be transferred to the Reorganization Committee early this month; that the new company will have a cash capital of \$2,000,000, and proposes to make several improvements, including the new branch from Tariffville, Conn., to Springfield, Mass.

ST. LOUIS & NORTHERN SHORT LINE.—The certificate of organization, dated Oct. 1, and filed Dec. 30 at the office of the Secretary of State of

Illinois, incorporates this company as successor to the St. Louis, Peoria & Northern. The company is empowered to build and acquire railroads as follows:

"To construct a railway from a point between Peoria and Pekin, near Grove, to East Clinton, with a branch at or near Genesee, to the Mississippi River, near Moline, and to acquire by lease or purchase a railway from East St. Louis to a point at or near Peoria; also to construct or acquire by lease or purchase a branch from a point on said railway north of Springfield to a point at or near Chicago, and also to construct or acquire by lease or purchase a branch or cut-off from a point on said railway at or near Glen Carbon to a point at or near Mount Olive, and also to construct a branch from a point at or near Marine to Sparta, and also to construct or acquire by lease or purchase such other branches or spurs as may be necessary or convenient and allowed by law, and to equip and operate its said railway and branches so constructed and acquired between said terminal points." (Nov. 4, p. 806.)

SALINEVILLE.—The sale of this property to the Cleveland & Pittsburgh line of the Pennsylvania Co. is officially confirmed. It is a small branch coal road, extending from the C. & P. tracks to Salineville, O., 3.07 miles. (Dec. 23, p. 926.)

SUMMIT BRANCH.—The Reorganization Committee has issued a circular to the effect that the Pennsylvania RR. is willing to buy the securities of the company on the following basis:

To pay one-third of the face value of the old Summit Branch bonds, that is, \$333.33 for each \$1,000 bond, and to buy the stock in the new Summit Branch Coal Company held by individuals at \$9 per share, the amount contributed by them under the reorganization. This offer will remain open until Jan. 10. Security holders not wishing to sell on this basis may get the stock and bonds called for under the original plan after Jan. 31, 1898. (March 11, 1898, p. 190.)

TERRE HAUTE & INDIANAPOLIS.—Volney T. Malott, receiver, has been given permission by Judge Woods, of the United States Circuit Court, to pay \$62,500 interest due Jan. 1 on the mortgage bonds of this line, and \$37,920 on the Vandalia & Terre Haute, held by the Pennsylvania Co. (Aug. 5, p. 572.)

WABASH.—The directors have decided to pass again interest on the \$3,500,000 A debenture bonds. They are non-accumulative income bonds, and are preferred over the series B. A similar passing of interest was made in July. (June 17, p. 446.)

WASHBURN, BAYFIELD & IRON RIVER.—Judge Bunn, of the United States Circuit Court, at Madison, Wis., on Dec. 24 appointed Geo. M. Seward, of Chicago, as receiver of this company. Mr. Seward represents A. C. Frost & Co., of Chicago, who have been advancing funds to carry on the road. He took possession of the property on the same day. Action was due to the failure to pay salaries to employees for the past two or three months. The line was completed last year, and runs from Iron River, Wis., east to Washburn, about 26 miles, with a branch north to Bayfield, about 13 miles.

WICHITA & WESTERN.—This property was sold at chancellor's sale at Kingman, Kan., Dec. 30, to Mr. Dunlop, of Topeka, Kan., representative of the Atchison, Topeka & Santa Fe, for \$75,000, the buyer assuming the indebtedness of the road. The line originally was 79.5 miles long, but a large part of the mileage has been abandoned. It went into the hands of a receiver Jan. 14, 1895. The Atchison holds most of the bonds. (Dec. 9, p. 888.)

WILMINGTON & NORTHERN.—The property of this company went into the hands of the Philadelphia & Reading Jan. 1. The P. & R. recently bought a majority of the stock. (Oct. 28, p. 788.)

YORK SOUTHERN.—Judge Bittenger, at York, Pa., on Jan. 2 handed down an opinion sustaining the sale of this property to local capitalists. The sale was objected by the Pennsylvania on the ground that W. F. Walworth, President, had violated a contract in which he offered to sell that company the road. (Sept. 9, p. 657.)

Electric Railroad News.

ATLANTA, GA.—The Atlanta Consolidated St. Ry. Co. has filed a refunding mortgage in favor of the Mercantile Trust & Deposit Co., of Baltimore, to the amount of \$2,500,000 of 5 per cent. bonds. The bonds to be refunded consist of an issue of \$2,025,000 6 per cent. bonds of July, 1891, of which the Old Colony Trust Co. is trustee.

DANVILLE, VA.—According to report, negotiations are pending for the sale of the Danville St. Car Co. P. R. Jones is President.

DETROIT, MICH.—A temporary injunction has been granted the Detroit, Lake Shore & Mt. Clemens RR., restraining the Mt. Clemens & Lakeside Traction Co. from transferring or disposing of its property to the Rapid Ry. Co. Last week it was reported that the Rapid Ry. had secured control of the Mt. C. & L. T. Co. The D. L. S. & Mt. C. has also asked for a receiver and to be declared the owner of the Traction Company's stock. (Dec. 30, p. 940.)

JERSEY CITY, N. J.—Bernard M. Shanley, General Manager of the North Jersey St. Ry. Co., has bought, with others, the North Hudson County Ry. Co. It was at first reported that the North Jersey St. Ry. Co. was behind the deal. The North Hudson County Ry. starts from the Hoboken Ferries in Hoboken, and runs through the northern part of Hudson county. The company operates 50 miles of road. Among those associated with Mr. Shanley are J. Herbert Ballantine, of Newark, and Miles Tierney, of Jersey City. The price paid for the stock is said to be \$160 a share.

The foreclosure sale of the Union Traction Co. of New Jersey is set for Jan. 27. There is no upset price. Over seven-eighths of the outstanding bonds are on deposit with the McCormick Reorganization Committee, which is to buy in the road. Pursuant to its terms, the reorganized company will issue \$650,000 stock and \$500,000 first mortgage 5 per cent. gold bonds.

LOS ANGELES, CAL.—The Los Angeles & Pasadena Electric Ry., operating between Los Angeles and Altadena, has been sold for \$1,000,000. C. P. Huntington, H. E. Huntington, A. Borel, C. De Guygne and I. W. Hellman are named as the purchasers of the property. The L. A. & P. Ry. is a reorganization of the Pasadena & Los Angeles Elec-

tric Ry. and a consolidation of the Pasadena St. RR., City Ry. and Colorado St. Ry. companies. It consists of 44 miles of track, 22 of which are operated by electricity and the remainder by horse.

ST. LOUIS, MO.—According to report the Central Traction line has been sold to Brown Bros., of New York. This seems to be one of the steps in the plan of a consolidation of street railroads in St. Louis.

The People's Ry. is to be sold at auction Feb. 10, to satisfy the claims of the bondholders. There are \$2,000,000 of bonds outstanding, together with preferred creditors amounting to \$60,000 and interest on the bonds, and taxes aggregating, approximately, \$125,000. (Oct. 21, p. 770.)

SYRACUSE, N. Y.—The Syracuse & East Side St. Ry. was sold Dec. 29 for \$30,000, to the representatives of the Reorganization Committee. This committee, William B. Broomall, of Chester, Pa., John P. Brosius and William P. Pyle, of Philadelphia, announce that they propose to form a new company and operate the road independently. Improvements are expected. The S. & E. S. St. Ry. was leased to the Syracuse Rapid Transit Co. in 1895.

WASHINGTON, D. C.—The Brightwood Ry. Co. of Washington, has filed a mortgage to secure \$250,000 5 per cent. 19-year bonds, to the Colonial Trust Co. as trustee, and one for \$50,000 5 per cent. 15-year bonds to the American Security & Trust Co. The new bonds are for use in refunding the existing funded debt, which is about \$550,000, all of which bears 6 per cent. interest.

WORCESTER, MASS.—The State Railroad Commissioners have approved an issue of coupon or registered bonds by the Worcester & Clinton St. Ry. Co., not to exceed \$115,000, payable at periods not exceeding 20 years, the interest not to exceed 5 per cent. The company has filed its certificate of payment of \$150,000 capital stock. Charles E. Dusser, Secretary, Leominster, Mass. (Sept. 16, p. 679.)

The State Railroad Commissioners have also approved an issue of \$40,000 additional stock by the Worcester & Marlboro St. Ry. Co. for floating its funded indebtedness. (Dec. 16, p. 906.)

TRAFFIC.

Traffic Notes.

The Railroad Commission of Texas proposes to regulate the charges of the sleeping car companies and has notified the companies to file in the office of the Commission copies of their contracts with the railroad companies, together with their schedule of charges for accommodations afforded to travelers.

The Merchants' Association, of New York City, has secured from the railroads in the Trunk Line, the Central Passenger and the Southwestern Passenger associations reductions in round trip tickets for merchants visiting New York between March 16 and 21 and between April 3 and 6. It is said that these traffic associations have agreed to sell round trip tickets at a fare and one-third.

The Timberman, in an editorial on the subject of demurrage charges for freight cars, complains that the fact that demurrage is charged on cars of lumber at some cities and not at others works a marked injustice to lumber dealers in some places, the amounts charged on cars set for loading making a material addition to the cost of lumber on board the cars at some shipping points. Most of the principal lumber shipping points in Wisconsin are free from the demurrage charge and shippers at these points thus have an advantage over others, which, it is claimed, affects competitive prices. Of demurrage regulations in general, The Timberman expresses decided approval.

The North Dakota Freight Rate Injunction.

The decision of the U. S. Circuit Court at Fargo, N. D., making permanent the injunction against the State Railroad Commissioners, who had prescribed reduced rates for the railroads of the state, was reported in the last issue of the Railroad Gazette.

The Great Northern, the Northern Pacific and the Chicago, Milwaukee & St. Paul were the applicants for the injunction. The evidence presented by the roads, which was based on the records of four years, 1894 to 1897, inclusive, showed that on the basis of ton mileage the freight traffic which was moved wholly within the state of North Dakota was equal to less than 3 per cent. of the interstate traffic moved in that state. In Minnesota the interstate traffic equaled about 47 per cent. of the interstate traffic moved in that state. Of the receipts on freight moved wholly within North Dakota more than 80 per cent. comes from less than carload lots, and the average haul on all of the freight moved by the roads is from 350 miles to 500 miles. It was conclusively shown that either the rates fixed by the Commission are unreasonably low or else the existing interstate rates are grossly excessive. According to the averages computed in the annual reports made by the companies to the State Railroad Commission for the four years referred to, operating expenses on the Great Northern on local business were 88 per cent.; under the tariffs fixed by the Commission the income on this freight would be reduced 13 per cent., bringing it down to about 1 per cent. less than expenses. On the Northern Pacific the loss would be much greater.

The court said in the decision that in determining the reasonableness of interstate rates the court could not take into consideration the carrier's whole business.

Commenting on this decision, the New York Evening Post says: "Judge Amidon, District Judge for Dakota, and Judge Thayer, of St. Louis, sitting with him, find that under the proposed reduction of about 14 per cent. the rates would not yield a sufficient return to pay for the cost of handling the traffic; that they are therefore unreasonable, and that the order restraining their publication should be continued. To the lay mind this doctrine of 'reasonableness' seems in conflict with the one laid down by the Supreme Court in the pooling case (Joint Traffic Association), in which it was held that a law of Congress need not be reasonable in order to be binding. But as North Dakota will probably appeal its own case to the Supreme Court, we shall find out in time if there is a conflict or not. Meanwhile, the decision of the District court is a severe blow to the railway barons of the West."